

COMPUTERWORLD

INSIDE

Spotlight — Grappling with automation of application development. Pullout section follows page 72.

In Depth — What do you get when you cross a data base with an expert system? **Page 89.**

Software AG bombards users with products and promises, including text management capability for Adabas. **Page 4.**

T1 vendors' resistance to ISDN is fading as several prepare endorsements of the telecommunications standard. **Page 6.**

Akers and Olsen pledge tight cost controls at IBM and DEC in face of economic uncertainty. **Pages 8, 9.**

Failed but fun. Users hold on to their old Lisa and Apple III systems. **Page 42.**

AT COMDEX:

IBM plays its hand in the LAN game, appeasing vendors that had squared off over the issue of Microsoft's LAN Manager. **Page 139.**

Clone makers debate whether to stick with the old standard or attempt to emulate Micro Channel. **Page 138.**

Lotus wants to put free-form data base on user agenda. **Page 140.**

Commodore offers peek at 8088-based system due out early next year. **Page 141.**

IBM opens throttle on OS/2 line

Standard, Extended Editions accelerated; user interface takes backseat

BY ED SCANNELL
and DOUGLAS BARNEY
CW STAFF

LAS VEGAS — In an effort to provide MIS with proprietary microcomputer data base and communications facilities more quickly, IBM last week unveiled a version of OS/2 Extended Edition that it said will be available next July.

IBM accelerated the Extended Edition delivery schedule by three months by dropping the graphical Presentation Manager component from the first release of the operating system. Delivery of an Extended Edition including the Presentation Manager is now set for October 1988.

IBM's first act of good faith regarding OS/2, which it is jointly developing with Microsoft Corp., was to announce the shipment of OS/2 Standard Edition 1.0 by Dec. 4, months before the company's self-imposed deadline. Standard Edition is the first true multitasking operating system from IBM for its micros. It allows users to run multiple applications simultaneously and exchange information among those applications, the firm claimed.

The originally announced version — OS/2 Extended Edition 1.1 — required the Presentation Manager but did not take advantage of its graphics capabilities. OS/2 Extended Edition 1.0 will ship before Version 1.1 because it does not require the Presentation Manager, IBM said.

OS/2 Extended Edition includes an IBM SQL-driven data base, a variety of terminal emulation facilities and support for a large number of communications protocols.

Both components are deemed critical to the long-term success of OS/2.

Continued on page 139

AIX gives multiuser hue to PS/2

BY JAMES CONNOLLY
CW STAFF

LAS VEGAS — IBM took the first step in the long-expected move to make its Personal System/2 Model 80 a multiuser system last week when it announced a September 1988 delivery for a PS/2 version of AIX that supports 16 concurrent users.

A PS/2 Model 80 running AIX, IBM's primary small-system Unix offering, would be well equipped to compete in the departmental processing and small-business markets against systems such as the NCR Corp. Tower 32/400, the Digital Equipment Corp. Microvax II and Microvax 2000 and the Altos Computer Systems Altos 386 Series 1000, according to industry observers.

IBM's low-end Unix role has been filled, to a limited extent, during the past 22 months by the RT Personal Computer reduced instruction set computing workstation. Analyst Marty Gruhn, vice-president of Tempe, Ariz.,

Continued on page 8

Mac attack in business

Comdex crowds point up heightened appeal

BY JULIE PITTA
CW STAFF

Apple Computer, Inc.'s well-chronicled efforts to break into the Fortune 500 market appear to be gathering steam.

Interest in the Macintosh seemed to be at an all-time high at Comdex/Fall '87 last week. Crowds were not deterred by Apple's less-than-prime location in a room off the convention center floor, a result of its two-year absence from the show.

Attendees packed the booth and seemed especially eager to see demonstrations of Apple Hypercard applications on the Macintosh II.

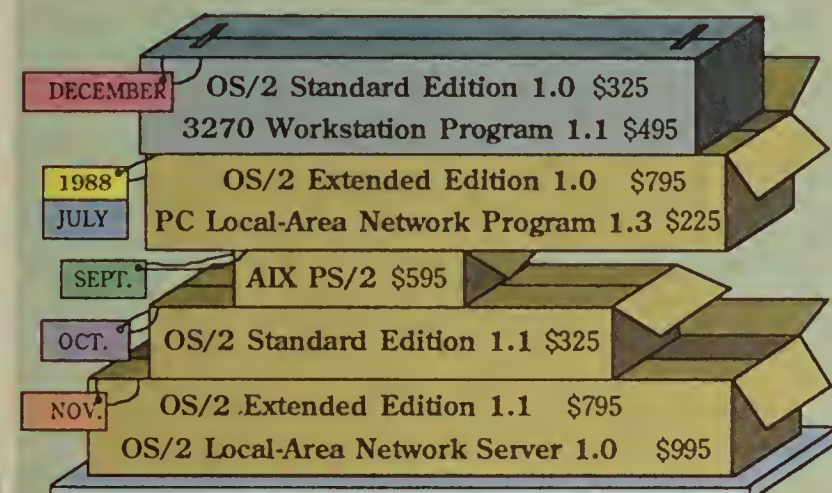
Mac talk

"There was a lot of talk about the Mac at the show," said Tom Young, an industry analyst at

Continued on page 10

Going out the door

OS/2 is almost ready, but Extended Edition is eight months away



INFORMATION PROVIDED BY IBM
CW CHART: AMY J. SWANSON

IN DEPTH

James Martin's show goes on

BY GLENN RIFKIN
CW STAFF

Perched on a hillside amid the lushness of Vermont's Green Mountains, James Martin's summer hideaway offers a 100-mile view in all directions on a clear day. Along with the beauty and isolation of this contemporary villa, it is no small advantage to Martin to be able to see over a great distance. A broad view outward has characterized the MIS industry's leading writer and guru for nearly 25 years.

Martin's career is marked by a string of accurate predictions coupled with know-how that not only made him a multimillionaire but has kept him remarkably unscathed in his lofty roost as a top industry seer. Although Martin's presence has faded some-

Continued on page 99



GLENN RIFKIN

IN THIS ISSUE

Gambling on OS/2. Although Comdex attendees from small firms say PS/2 is not the solution for them, announcements regarding IBM's next-generation systems were plentiful. They included Novell's extension of Netware to offer capabilities similar to OS/2 Standard and Extended Editions, Intel's Above Board for PS/2 users and Phoenix Technologies' ROM BIOS-compatible products for PS/2s. Pages 138, 140, 141.

NEWS

- 4** Software AG enters CASE market.
- 4** VAX line gets five new products from Software AG.
- 6** Stratus extends high end of XA 2000 processor line.
- 6** T1 vendors approach endorsement of ISDN standard.
- 8** Akers says IBM will continue aggressive price cutting.
- 8** IBM offers customers round-the-clock service.
- 9** Olsen says DEC preparing for recession.
- 9** Telex responds to takeover bid.
- 14** PC users groups propose nationwide organization.
- 15** Bell Atlantic seeks appeal to information services ban.
- 16** Computervision moves Cadds to Sun workstation.
- 16** IBM integrates PS/2 in banking applications.
- 16** MAP link for VM in the works at IBM.
- 17** ADAPSO, IIA to work together — but not merge.
- 18** Construction of Washington, D.C., trade center under way.
- 18** Sorbus to service DEC hardware.
- 138** Industry leaders sound off on OS/2 ship date.
- 138** Clone makers resist Micro Channel architecture.
- 139** OS/2 Database Manager still lacks key features.
- 139** IBM develops OS/2 network server.
- 140** Kapor says Agenda "allows people to organize real-world information."
- 140** Desqview enhanced to run on 386-based systems.
- 140** Xenix 386 goes to Tandy 4000.
- 141** Wordperfect 5.0 to debut.
- 141** Commodore enters DOS marketplace.
- 142** Novell reveals technology exchange agreements.
- 142** Borland develops OS/2 version of Paradox.



Scaling development automation. Follows page 72.

SOFTWARE & SERVICES

- 23** Banks test financial expert system.
- 23** Newcomers threaten VM Software.
- 23** Expert systems tool is CICS missing link.

MICROCOMPUTING

- 41** Informix prereleases OS/2 tools.
- 41** Unisys offers three Intel-based micros.
- 41** Applix aims OA tools at 386-based PCs.

NETWORKING

- 59** Cincom targets Net/Master at Netview.
- 59** Novell unveils series of Mac-to-mainframe products.

SYSTEMS & PERIPHERALS

- 77** Some say System/36 PC has staying power.
- 77** Xerox to move to Sparc Unix platform.
- 77** HP extends commercial marketing of Unix.

Quotable

"Some people are willing to pick up and move their whole families... and some people are willing to go on vacation."

WALTER BURDICK
IBM

On IBM's employee restructuring and redeployment plan.

MANAGEMENT

- 107** Loren wants to make a difference at Apple.
- 107** Baxter, American Hospital make merger work.

COMPUTER INDUSTRY

- 113** Sun basks in success, but is its future as bright?
- 113** CDLA examines IBM maintenance offer.
- 113** Toshiba laptop exports halved by chip tariff.

COMPUTER CAREERS

- 120** The nontechnical side of MIS.

IN DEPTH

Profile: Consultant James Martin is still sitting pretty — above the controversy. By Glenn Rifkin.

Starts on page 1.

89 Vendor roundtable: When you anoint data bases with AI, what's in it for users? With Esther Dyson.

SPOTLIGHT

The pressure is on to build a strategy for automation in application development. **Follows page 72.**

OPINION & ANALYSIS

- 21** Newquist holds a mirror up to nature.
- 23** Reed teaches the development process.
- 41** Scannell says Micro-soft is having bug trouble.
- 59** Horwitt wants standards standard raised.
- 77** Connolly shatters the departmental computing myth.

- 107** Ludlum questions the future of the CIO.
- 113** Gibson joins lessors peering into IBM's psyche.

DEPARTMENTS

- 20** Editorial
- 112** Calendar
- 132** Buy Sell Swap
- 142** Inside Lines

NEWS

Relief for broker?

Goldman Sachs taps Adam for top MIS post

BY ALAN ALPER
CW STAFF

NEW YORK — Investment banking firm Goldman, Sachs & Co. last week ended a long-term search to fill a vacancy at the helm of its problematic MIS and telecommunications operations by naming a new chief information officer.

Rick Adam, formerly corporate vice-president, president and chief executive officer at the Systems Division of Baxter International, Inc. in Chicago, will assume responsibility for Goldman Sachs' systems, telecommunications and technology planning.

Although it is a new position, Adam will be handling many of the functions previously presided over by Goldman Sachs' former MIS honcho, Abraham Weiss, who reportedly resigned under fire earlier this year.

Adam, 41, comes on board at a crucial time for Goldman Sachs. For the last four years, Goldman Sachs has attempted to convert from Unisys Corp. to IBM mainframes. The conversion effort has been beset by a variety of managerial, technological and environmental problems, sources said. The protracted conversion effort is believed to have played a part in Weiss's departure from the firm.

David George, a partner at Goldman Sachs, would not comment on circumstances surrounding Weiss's departure. He

did say that the conversion from Unisys to IBM hardware was proceeding apace but would not provide a projection on when the work was expected to be completed. "We're a good distance down the road in completing the project, but we still have some work to do," George said.

Goldman Sachs' IBM hardware was recently damaged by a flood caused by ceiling pipes that burst [CW, Aug. 3]. That equipment has been replaced and is not believed to have caused the firm substantial delays.

Technology direction

As chief information officer at Goldman Sachs, Adam will direct the conversion project and advise the investment firm on how to better use technology for a competitive advantage. One area in which technology can be better used, George said, is in coordinating the production and operations sides of Goldman Sachs' business. Adam will report to George, a partner involved with the operations side of the firm's business.

In Adam, Goldman Sachs has acquired an accomplished leader with strong technological underpinnings, George said. "Rick [Adam]'s job is to marshal all of our resources to get the firm to where it wants to be."

Adam spent the last eight years at Baxter, a health care products and services provider formerly known as Baxter Travenol Laboratories, Inc.

DPMA urged to adopt Japan management ideas

BY DAVID A. LUDLUM
CW STAFF

SAN FRANCISCO — While the stock market fluctuations have left the federal government wary of borrowing money from the Japanese, data processing managers here last week were urged to borrow ideas from the Land of the Rising Sun.

In his keynote address to the annual conference of the Data Processing Management Association (DPMA), Robert A. Best, vice-president of planning systems and business development for Toyota Motor Sales USA, Inc., suggested those at the conference adopt the Japanese management techniques used in his organization.

Concepts such as teamwork, consensus, equality, simple organizational structures and recognizing employees' achieve-

ments have helped Toyota's DP operations maintain a turnover rate of 2%, Best said in an address that implicitly criticized many traditional American approaches to management.

Several DP professionals in the audience agreed with that criticism. Deborah J. Bryant, a programmer/analyst with Lomas & Nettleton Financial Group in Dallas, said managers often compete rather than work together. "Most of the time, management just seems to be trying to keep their own jobs and rising to the top," she said.

Managers are quick to criticize but slow to praise, said Don M. Duncan, a programmer/analyst with Tandy Corp. in Fort Worth, Texas, in reaction to the keynote speech. "Two years later, they remind you it took you longer on this project than it should have," he said.



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Adabas update handles text

Software AG enters CASE market with three-product series due in '88

BY CHARLES BABCOCK
CW STAFF

MIAMI BEACH — Software AG of North America, Inc., in a many-pronged approach to revitalizing its product line, is positioning Adabas as a multipurpose data base management system and entering the computer-aided software engineering (CASE) market.

At the company's 17th users group meeting here last week, officials of the Reston, Va., firm also sought to broaden its appeal to Digital Equipment Corp. customers by introducing five products for the VAX (see story below).

In addition, Software AG committed itself to providing a version of Adabas on personal computers at an unspecified future date. The firm announced Adanet, a networking product to allow the use of Adabas in a distributed configuration, shipping next year.

In another move, Software AG took its 2,000 users group attendees by surprise by committing itself to producing an optimizer for its fourth-generation language, Natural, that will produce code that executes more quickly than Cobol.

'Flooding the market'

"Software AG used to have half a dozen products. Now they're flooding the market," said Donald Brown, data base administrator for the Government Printing Office in Washington, D.C.

His office has a keen interest in the text management capability, which is slated to be added to Adabas in Version 5.0 and is scheduled to be out in the first quarter of 1988.

"The people at Software AG have got their act together this year. They're thinking a lot harder about where they want to be five years from now," said Dennis Bertrand, a data base analyst with Davis, Thomas & Associates in Minneapolis.

Text management, or the ability to store and process documents in a data base management system, will be followed by additional features next year, said Peter Snell, president of Software AG's West German branch.

Supports slew of uses

Snell said the nucleus of the product has been rewritten to support the following types of uses:

- Distributed data bases. Existing Software AG networking products will be united in a new product, Net Work, to allow Adabas to be used in a distributed fashion.

An additional \$20,000 to \$24,000 product, Adanet, slated to be available by the third quarter of 1988, will guarantee the integrity of update transactions through a two-phase commit process and will dynamically reconfigure the network if a node fails.

Snell said the Adabas DBMS — MVS 3090 version costing

\$174,000 — continues to sell at a rate of 80 to 90 copies a year in the U.S., and he said he expects the pace to pick up as IBM 9370 processors start being shipped in quantity.

- SQL relational support. While the company's West German executives mocked the U.S. market's preoccupation with SQL, Adabas will be able to process dynamic SQL queries by the end of 1988, they said.

SQL queries will perform less efficiently than Software AG's proprietary data access language, but Snell said his firm has decided to supply the support anyway.

After all, "some people like fish with whipped cream," he said. U.S. representatives said they wished their West German counterparts would stop deriding SQL, but users found the West German executives acting in character.

"That's the world according to Peter Snell," chuckled conference attendee Steven Carter, a consultant with Database Utility Group, Inc. The West Germans are confident of their own technology, he noted.

- Entity-relationship-attribute support. Based on the pioneering work of Peter Chen at Louisiana State University, Adabas 5.0 will support the entity-relationship-attribute data model often used to define and model complex business structures. The business models become patterns for information systems.

- Knowledge-based manage-

ment system. Adabas will support rule-based data types for building knowledge bases and expert systems within the next 18 months.

The support will probably include an expert system building shell for programmers, according to Mark Milne, Software AG product manager.

Adabas 5.0 will sell for \$25,750 to \$174,000, based on processor size.

Until Software AG's announcements, fourth-generation language vendors have been notably absent from the CASE field. Software AG's Natural Engineering Series is scheduled to be launched with a code generator, Natural Construct, and a mainframe repository, Predict CASE, in the second quarter of next year.

Although company officials boasted that the series will cover all steps of the development life cycle, the key step in which requirements and specifications are converted into designs remains vacant.

It will be integrated into the lineup after Software AG provides interfaces to existing PC-based design products, officials said.

The availability of those will be announced within the next few months, according to company spokesmen.

'A ways to go'

"They've got quite a ways to go. It's certainly not integrated CASE yet," said David Ostrom, administration systems manager at Washington State University in Pullman, Wash.

The Predict CASE repository — based on Software AG's Predict data dictionary, which was introduced in 1983 — will capture system requirements and specifications, validate specifications, check consistency and document steps in development. The repository will contain 800 rules for enforcing integrity, Software AG officials said.

The repository allows concurrent access by a large number of developers. It includes an entity-relationship DBMS, which allows interactive reporting and retrieval of development objects.

The repository runs under IBM's MVS, VM/CMS and CICS, TSO or CMS and will be priced from \$12,600 for VM/CMS Group 10 to \$75,000 for MVS/XA Group 40, according to the company.

The generator reportedly will include a library of model programs and program functions that can be customized to build an application in Natural.

It will produce optimized, compiled Natural code that will reportedly outperform Cobol, according to Software AG officials.

It will run under MVS, VS1 and VSE and will be priced from \$7,537 to \$45,000.

Intros shore up VAX offerings

Software AG of North America, Inc. expanded its line of products available on Digital Equipment Corp. VAXs last week with a program generator, an SQL interface to its Adabas and a graphics package that employs information from an Adabas data base, bringing the company's VAX product line total to 12.

The program generator, called Natural Construct, supports building applications based on three models: interactive file maintenance, file scrolling and menus.

In addition, the generator contains several model routines, including a function-key handler, a Help manager and command processors, according to Michael J. Schowalter, director of Software AG digital programs.

The generator can be used to modify existing applications as well as to build new ones, he said. Natural Construct is scheduled to be available in the first quarter of 1988 at a price ranging from \$3,130 on a DEC Microvax to \$25,000 on a VAX 8800, according to the company.

Duplicates support

Adabas SQL, priced from \$1,500 to \$12,000, duplicates limited SQL support already available in Software AG mainframe products.

It consists of static SQL syntax embedded in a third-generation language that interfaces with Adabas to respond to SQL queries. It is available immediately.

Natural Graphics is a decision-support tool and presentation aid that can produce three-dimensional, stacked,

horizontal and stock-price charts as well as combinations of graphs and text, the vendor said.

It is set to be available in the first quarter of 1988 at a price of \$1,500 to \$12,000.

Workbench provides a menu-driven outer shell for Software AG products on the VAX, including Adabas, the Natural fourth-generation language, the Predict data dictionary and the Super Natural end-user language. It will be offered as a component of Natural in the first quarter of 1988, Software AG spokesmen said.

The firm also offered a \$2,500 to \$16,000 computer-based training system, Natural Elite, to provide student access to the core products through on-line Help, menus and function keys.

CHARLES BABCOCK

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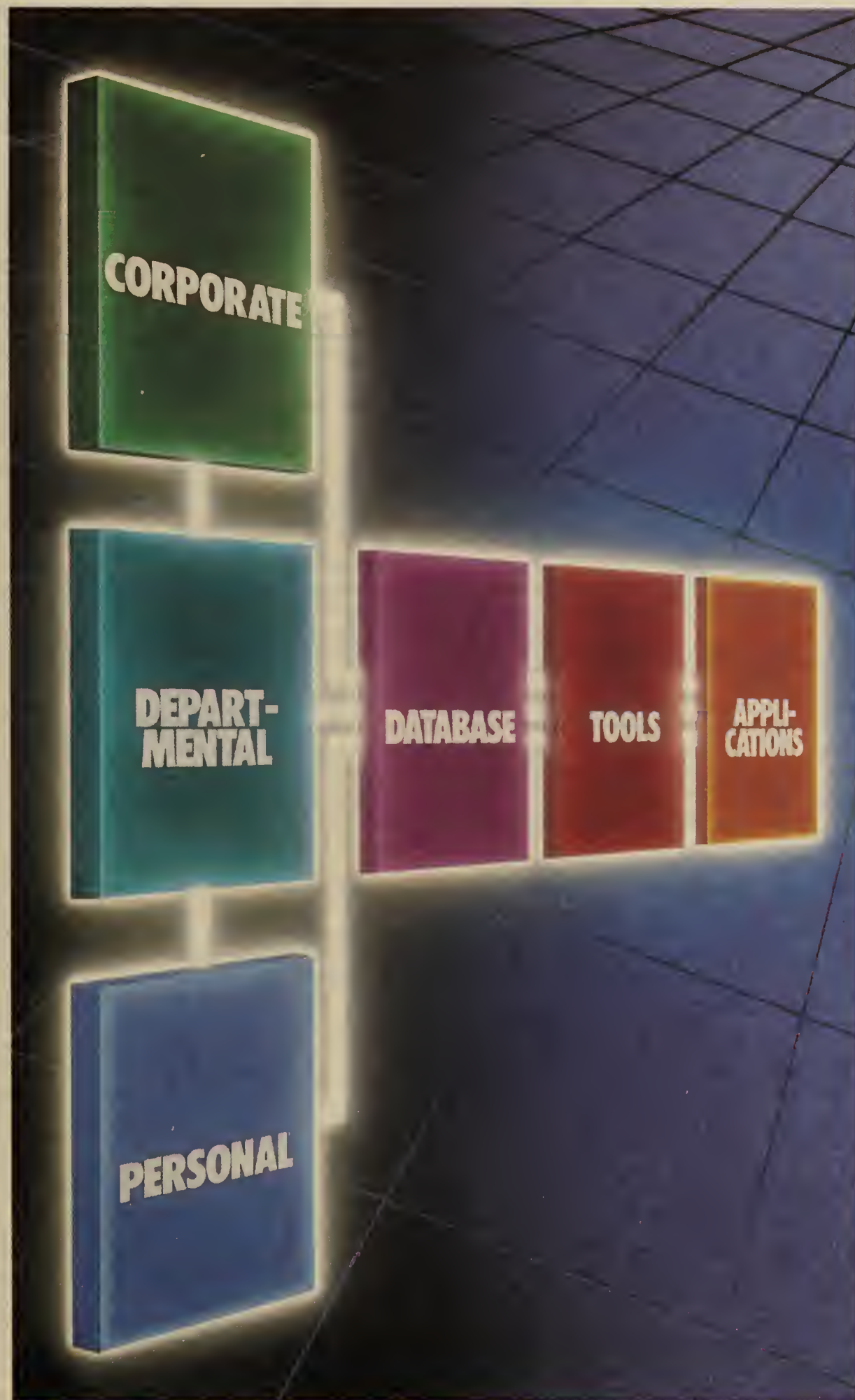
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Stratus lengthens high-end processor line

Firm adds up to two processor sets to its XA 2000 series of systems

BY JAMES CONNOLLY
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc. today plans to address what it claims was an unexpected user demand for high-end processing power by extending its line of on-line transaction processing systems.

The introduction, scheduled to coincide with the opening of the Stratus users group meeting in San Francisco, involves the addition of one or two processor sets to the Stratus XA 2000 series, which was announced in February with up to four CPU sets. In Stratus's hardware-oriented fault-tolerant architecture, each processor set includes

range from 17 transaction/sec. to 47 transaction/sec., according to William B. Elliot, Stratus vice-president for product marketing.

"When we introduced the XA 2000s in February, we predicted that the Models 110 and 120 would be the big sellers. We expected to sell some 130s and 140s, but we thought most of the activity would be at the lower end. We did sell a lot of 110s and 120s, but we were surprised at how many 130s and 140s we sold," Elliot said during a briefing last week.

He added that several major user projects now under way in the financial services and telecommunications industries are based on the Models 130 and

announced. Analyst Chris Hallgren said, "There had been questions about how Stratus was going to go about pushing up the high end. The older XA 600 had six processors, so it only made sense that they would go to six processors on the XA 2000, too."

Elliot said addition of the fifth and sixth processor sets to convert a Model 140 to a Model 150 or 160 involves no more than two hours of work by a Stratus field service engineer. In addition to plugging in the processors, the installation requires changes to the power supply and cables. Elliot said those modifications will be designed into all XA 2000 systems beginning in early

1988, so future upgrades will involve only the customer's sliding the new processors into the 40-slot chassis, which is how upgrades to the Models 120, 130 and 140 are now accomplished.

VOS Release 7.0 was designed for use on all XA 2000 models. It supports 96M bytes of memory, compared with the 64M-byte limit of VOS Release 6.0. It also includes a configurator for managing

Stratanet networks, permanent virtual-circuit support for CCITT X.25 communications and expanded support for international character sets, including Kanji, Hiragana and Katakana.

The Models 150 and 160 are scheduled for first-quarter 1988 availability. Prices for a CPU, a VOS license and 32M bytes of memory start at \$675,000 for the Model 150 and \$750,000 for the Model 160.

Typical base configurations including disk and tape drives and controllers start at \$825,000 for the Model 150 and \$900,000 for the Model 160.

Stratus's top end

Five- and six-processor systems raise transaction rate to more than 50 transaction/sec.

Stratus XA 2000 series specifications	Model 110	Model 120	Model 130	Model 140	Model 150	Model 160
Processor sets	One	Two	Three	Four	Five	Six
Memory (bytes)	8M to 96M	16M to 96M	16M to 96M	32M to 96M	32M to 96M	32M to 96M
Transaction/sec. ¹	17	27	37	47	57	67
Base price ²	\$260,000	\$347,000	\$570,000	\$750,000	\$825,000	\$900,000

¹ Stratus claims based on ET-1 benchmark with 90% subsecond average response time

² Price for CPU, operating system, four disk drives and nine-track tape drive and controllers

CW CHART

a primary and a backup CPU board with duplicated CPUs on each board.

Stratus also announced a version of its VOS operating system with support for up to 96M bytes of memory and easier network configuration under Stratus's Stratanet network.

The XA 2000 Models 150 and 160 process 57 and 67 transaction/sec., respectively, under Stratus's version of the ET-1 benchmark based on 90% subsecond response time. The four previous XA 2000 systems, the single-processor Model 110 through the four-CPU Model 140, covered a performance

140 and that Stratus wanted to provide that type of user with additional growth potential. He said brokerage houses using Stratus systems have not reached performance limits, even during the recent stock trading frenzy, although some of those customers have come close enough to system capacity to want the performance cushion the new high-end systems will provide.

An analyst with International Data Corp., a Framingham, Mass., market research firm, said Stratus's move to a six-processor configuration has been expected since the XA 2000 was

Acer, TI ink subcontracting pact

LAS VEGAS — Acer Technologies Corp. announced last week that Texas Instruments, Inc. will subcontract the manufacture, assembly and testing of Acer's IBM Personal Computer AT compatible, the Acer 910, and Intel Corp. 80386-based Acer 100 personal computers for U.S. and Canadian markets.

According to the announcement, made at Comdex/Fall '87, TI will ramp up production of the units during the next six months to produce more than 5,000 units per month. It will then ship

the computers directly to San Jose, Calif.-based Acer's national distributors, the firms said.

Acer President Stephen McKenzie said that with additional units being manufactured

by TI's Data Systems Group in Austin, Texas, the current 12-week delivery time for the Acer machines will be reduced to four weeks. Neither firm would comment on the contract's value.

CORRECTIONS

IBM's VM/Integrated System 5.1 [CW, Oct. 26] will be available in May 1988. IBM recommends that another new product, CICS/VM, run under VM/IS, but VM/IS is not re-

quired, IBM spokesmen say.

The telephone number for Pyramid Technology is 415-354-4441. A listing in the Oct. 26 Spotlight was incorrect.

T1 vendors lining up behind ISDN standard

BY ELISABETH HORWITT
CW STAFF

Leading T1 equipment vendors, whose products could play an important role in user implementation of Integrated Services Digital Network (ISDN), are planning to announce endorsement of the telecommunications standard. Several companies will introduce support for the ISDN primary rate interface by first-quarter 1988, *Computerworld* has learned.

But the pricing, commercial availability and feature-richness of the products will depend on how the market develops in 1988, vendor spokesmen said.

The T1 industry has resisted ISDN, some observers have claimed, because the standard will provide universal availability for certain value-added features, such as dynamic bandwidth allocation, that have been offered primarily on proprietary T1 switches.

However, once users start implementing ISDN in sufficient numbers, they will begin demanding that their T1 switches provide interfaces to ISDN-compatible offerings such as private branch exchange (PBX) and AT&T's Primary Rate service, vendors and consultants said.

The primary rate interface is the ISDN equivalent to a 1.5M bit/sec. T1 link since it defines 23 B channels, each supporting 64K bit/sec., and a separate D channel that supports signaling between different network devices.

'Negative press'

"ISDN has been getting mostly negative press, but a lot of vendors and users we work with are building applications like call processing and direct access from the network to a client's data base or to customer-premise equipment, like a front-end processor," said Dixon Doll, chairman of The DMW Group, Inc., a consulting company in Ann Arbor, Mich.

"What will drive [our ISDN product announcement schedule] is the number of customers that want to interface with ISDN services and how much they are willing to pay for value-added functionality," said Kurt Jagers, network systems products marketing manager at Network Equipment Technologies Corp.

The T1 vendor tentatively plans to announce an ISDN primary rate interface in the first quarter of 1988, with possible shipment by the end of that year. The company is investigating what features it will add to ISDN D channel functions such as routing and network management,

Jagers said. However, it expects ISDN demand to build slowly, which could put off commercial availability. "And if customers say they just want ISDN as an alternative interface, we will be constrained in the pricing and functionality we offer," Jagers emphasized.

Digital Communications Associates, Inc.'s (DCA) T1 switch subsidiary, Cohesive Network Corp., is also waiting for a better understanding of user application needs before committing to ISDN.

'A useful synergy'

The company is working jointly with chip makers, PBX companies and interexchange carriers to evaluate various applications that can provide "a useful synergy between the various products in the ISDN environment," said Gerald Dooley, DCA's vice-president of technology.

For example, the PBX could use the ISDN D channel to request the T1 multiplexer to provide more bandwidth or route channels to different destinations, he said. Conversely, the T1 multiplexer could send bandwidth reconfiguration instructions over the D channel to the interexchange carrier's system once carriers provide dynamic reconfiguration as an ISDN service.

DCA and its partners plan to jointly initiate beta tests to try out ISDN applications within the next 12 to 18 months, according to Dooley. In the interim, the company plans to announce initial ISDN offerings to support future offerings, he added.

Avanti Communications Corp. is expected to announce an ISDN Primary Rate card for the ONX T1 switch in the first quarter of 1988, according to company President Thomas Taylor. "We won't announce an ISDN interface before there is a service to interface with," he explained, referring to AT&T's expected introduction of a primary rate service late this year [CW Oct. 12]. "And we have been working with the ANSI T1Y1 committee [on D channel protocol development], pacing our implementation with its progress."

Infotron Systems Corp. is working on a primary rate introduction for the 1988 time frame but plans no formal introduction within the next few months, a spokesman said. The company already sells an ISDN basic rate interface that defines two 64K bit/sec. B channel links.

Timeplex, Inc. said it will not discuss its ISDN plans until a press and analysts meeting the company plans to hold tomorrow.

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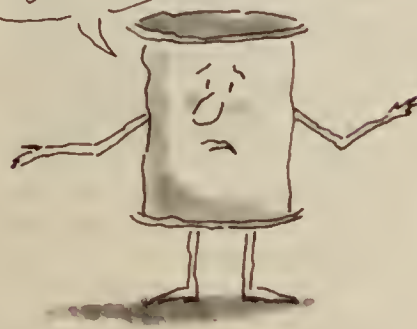
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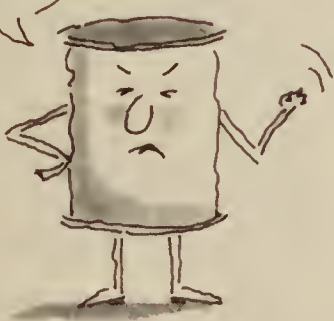
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Akers: Discounting to continue unchecked

BY CLINTON WILDER
CW STAFF

THORNWOOD, N.Y. — IBM will continue its aggressive price-cutting and discounting throughout its product line in order to win business, IBM Chairman John F. Akers said in his annual address to securities analysts last week.

"We are more aggressive on price than we have been in the past," Akers said during the day-long meeting with more than 150 analysts at IBM's Corporate Education Center. "When price is a determining factor in our business, we're not afraid to take price action."

Akers said IBM intends to focus much more attention on the Personal System/2 evolution than it did on the Personal Computer. "When I last talked to you about the personal computer business," Akers said, referring to last year's speech to analysts in San Jose, Calif. [CW, June 23, 1986], "we were talking about a 5-year-old product line. We will make sure we don't have that kind of gap again. We will improve [the PS/2] every year in function and cost."

Akers said 1987 revenue from 3090 mainframe sales would show only a slight increase over 1986 levels. He said sales of mid-range systems, everything between the PS/2 and the 3090, will be flat, reflecting the transition to the 9370. But microcomputer and workstation sales will be up strongly, reflecting the brisk early sales of the PS/2 after

a sluggish 1986 for the IBM PC.

Akers was cautiously optimistic about IBM's financial prospects for the next six months, predicting modest profit growth barring an economic recession. But the key component of the



John F. Akers

earnings growth is a significantly reduced cost structure — not a robust surge in product sales.

Akers said IBM's unprecedented cost-cutting program put the company on a course where a 3% to 4% revenue gain will produce a comparable growth in earnings. The so-called balance point was as high as 15% in IBM's high-growth days of the early and mid-1980s. In 1986, IBM's profits plunged 27% while revenue increased 2%.

"We are a far better balanced business today than we were two years ago," said Frank A. Metz, IBM senior vice-president of finance and planning. Metz, however, said 3% to 4% sales in-

creases would only produce earnings gains if the mix of products sold has a greater concentration of high-margin mainframe sales.

Having reduced its expenses, Akers said, IBM is anticipating modest but solid earnings growth in early 1988. If the recent stock market fluctuations result in a capital spending drop by IBM's customers, he said, IBM is prepared to "manage through it."

"IBM is planning for growth next year, despite what happened Oct. 19," Akers said. "We can hunker down in 1988, but we're not prepared to execute that strategy yet. . . . We can't turn the company on a dime in the first and second quarters. We will manage our business for the long term, and we will manage through a problem, if there is one."

Walter E. Burdick, vice-president of personnel, gave a barrage of details on how IBM reduced its worldwide work force by 3.5%, from 403,500 employees at the end of 1986 to 389,400 today, without any layoffs. Burdick said IBM intends to maintain roughly the current number in 1988.

Some 15,000 people took advantage of IBM's early retirement incentives. In addition, about 21,500 people switched jobs within the company this year. By redeployment, IBM cut 16,000 of its manufacturing jobs, 8,200 headquarters positions, 6,600 administrative jobs and 2,000 managers.

Many of the employees in those jobs were retrained, relocated or both. IBM added 10,900 sales representatives and systems engineers, increasing that part of the work force by 20%.

IBM ups service scope

Widens boundaries of its 24-hour service

BY STANLEY GIBSON
CW STAFF

In a move that could spur another round of maintenance price cuts, IBM last week gave all customers under its Maintenance Agreement 24-hour-a-day, 7-day-a-week service at no extra charge. That and several other service-related moves are seen as a reassertion by IBM of account control, a blow against third parties and part of a drive to sell more hardware, using maintenance as an inducement.

One third-party maintenance provider, Control Data Corp.'s (CDC) Engineering Services Division, said it would match IBM's moves, leading to speculation that others will follow suit.

In last week's announcement, IBM said it will deinstall equipment at one site and reinstall it at another customer's site within six months at no charge. The offer is good when the first customer displaces the equipment with a new IBM machine and the equipment is placed under an IBM Maintenance Agreement at its destination.

An added service

Previously, IBM had only offered free deinstallation and re-installation service when a customer's equipment was moved elsewhere at his location.

If equipment is deinstalled and reinstalled by another party, IBM said it would no longer recertify equipment to be covered under its Maintenance Agreement at no charge.

IBM also announced that time and materials maintenance will

be offered only from 8 a.m. to 5 p.m. except in certain emergencies, such as life-threatening situations at hospitals or where public safety is in jeopardy.

This is seen as a blow against maintenance providers who called on IBM during non-work hours if they were unable to solve a customer's problem.

"We will follow suit," said Jim Paster, IBM marketing manager for CDC Engineering Services. He said his firm will reduce its round-the-clock maintenance charges by 15%.

Paster also said CDC will absorb the cost of IBM maintenance recertification where necessary in removing and reinstalling equipment.

Paster downplayed the significance of not being able to call on IBM maintenance personnel during non-work hours. He said CDC seldom uses IBM except in extreme emergencies. He admitted, however, that IBM will gain from casting doubt on third parties' abilities to provide 24-hour and weekend maintenance.

The deinstallation and reinstallation part of the announcement was seen as boosting new equipment sales by making it easier for a customer to resell old equipment. The charge for recertification under IBM maintenance is seen as a blow against leasing, maintenance and refurbishment companies who now must pay a fee where they did not before.

"They are incorporating as many incentives to move hardware as possible," commented the head of a major leasing company.

AIX

FROM PAGE 1

market research firm The Sierra Group, said the machine could "fade into obscurity, being, for all intents and purposes, the last IBM product based on the IBM PC architecture." IBM has stated several times that it will support an AIX-compatible version of Unix on its 370 family.

Gruhn and other observers noted that a Unix-based system supporting one to 16 users would let IBM serve customers who demand Unix, particularly when Unix is requisite in a major bid. Observers listed recent Ford Motor Co. and McDonald's Corp. procurements and most U.S. government contracts as cases in which IBM might offer a Model 80-type AIX system.

Judith Hurwitz, a consultant with the Seybold Office Computing Group in Boston, said the AIX-based Model 80 shows promise. "I think there will be a market for it because Unix is be-

coming increasingly popular at that lower end," she said. A multiuser Model 80 is unlikely to hurt sales of the IBM System/36, with its proprietary SSP operating system, she said, because IBM will continue to focus on its proprietary product.

IBM said AIX on the Model 80 will support 16 concurrent users. However, company officials also said that physical connections for users can be made only through local-area networks or two-port, asynchronous adapter cards. Seven adapter cards plus the single standard serial port on a Model 80 would support 15 terminals, but the configuration would fill seven of the eight expansion slots on a Model 80. A spokesman said IBM intends to provide hardware support for 16 users.

Chicago-based consultant Neal Nelson, who benchmarked a Model 80 running Santa Cruz Operation's Xenix 5/386 in September, reported that several vendors have been promoting multiuser Xenix on PS/2s for

several months. Among the vendors are Santa Cruz Operation, Microsoft Corp. and Control Systems, Inc.

Bruce DeVries, a marketing specialist with Control Systems, said his company sells a \$595 four-port card and an \$895 eight-port card to provide mul-

tiuser Xenix support on a PS/2. He said the cards, which support up to 16 users, began shipping recently.

Nelson said Model 80 users may prefer Xenix to AIX because of the variety of tools offered with Xenix. His September tests involved running his com-

pany's 18-part Unix benchmark suite, known as Neal Nelson's Business Benchmark, on three different machines: a Model 80 running Xenix, a Tower 32/400 running AT&T's Unix System V, Release 2 and an RT PC Model 125 running AIX 2.1.1. He said the \$11,000 Model 80 was competitive with the \$20,915 RT PC and the \$17,750 Tower and that it beat them in some areas.

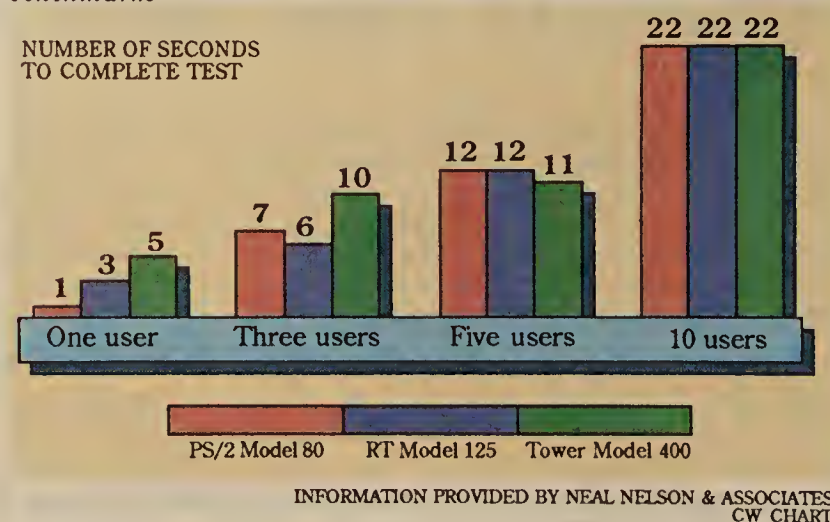
Nelson said that while IBM cites a limit of 16 concurrent users, the Model 80 performs best in environments with four to six active, general-purpose users.

On the portion of the test designed to simulate what Nelson calls "normal" tasks, with a mix of calculations and disk I/O, the Model 80 had a slight advantage over the Tower and was closely matched with the RT PC.

Nelson's various tests also showed the Model 80 holding an edge over the RT PC in computationally intensive tasks but trailing the RT PC in several disk-intensive tests.

Run for the money

IBM's Personal System/2 Model 80 running Xenix approaches or beats the RT PC and NCR's Tower in simulated multiuser benchmarks



DEC braces for recession

Olsen: cutbacks needed in shadow of stock market drop

BY STANLEY GIBSON
CW STAFF

BOSTON — Faced with a sharp drop in his firm's stock price caused by the recent Wall Street debacle, Digital Equipment Corp. President Ken Olsen said last week that DEC is taking steps to prepare for a recession, although there has so far been no slowing of customer purchases. Olsen delivered these comments at the firm's annual shareholders' meeting here.

"We are trying to be ready in case a recession occurs," Olsen said. DEC is slowing down hiring and capital expenditures in order to be prepared for an industry downturn that he said would result from a recession.

Looking toward new technology, Olsen also said DEC is well under way with several projects to make faster VAXs. Among them is a plan to offer a high-end, symmetrical, multiprocessor VAX that can be clustered [CW, Nov. 2].

"Clustering helps, but some applications require a single machine," he said.

Order rate stable

Olsen said customers are being careful in their purchases but not postponing orders. With no change in the customer order rate, DEC must keep its business

geared up to fill all outstanding orders, he said. He added that DEC plans no stock buyback in an attempt to boost share prices. He offered the view that other firms' buybacks have generally not been effective in raising stock values.

DEC is also no longer considering a stock split because of the turmoil on Wall Street, the DEC president asserted. A split had reportedly been considered when DEC shares traded in the \$190 range prior to the stock market nosedive. However, DEC stock was trading in the



Ken Olsen

\$130 range last week.

Olsen also responded to recent specu-

lation that DEC and Apple Computer, Inc. are planning to establish a more formal business relationship. The companies have been holding talks concerning connectivity between their computers, he said, but nothing is set for announcement.

"We want to make sure Apple computers fit well with VAXs. We match each other, and we work well together," Olsen said. He added that DEC is not considering acquiring Apple.

Olsen asserted that the recent decision by a federal appeals board that the U.S. Air Force can require operating systems to meet AT&T's Unix System V Interface Definition was satisfactory to DEC because it required interface definition beyond that specified in the original procurement.

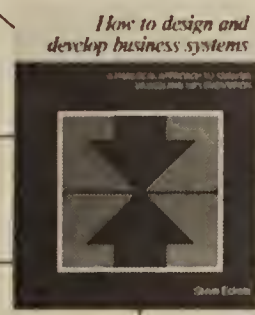
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Telex counters takeover bid

BY CLINTON WILDER
CW STAFF

TULSA, Okla. — Telex Corp. delivered its first formal response to the \$65-per-share hostile takeover bid of arbitrageur Asher B. Edelman last week, proposing an expensive recapitalization plan that would pay shareholders the equivalent of \$60 per share.

Analysts generally viewed the Telex plan as a potentially costly last-ditch effort to keep the company independent. Even though shareholders would receive less for their shares than they would under Edelman's offer, Telex said in a statement that its plan will offer investors greater value in the long term.

Edelman last week extended the deadline for stockholders to tender their shares of the terminals and peripherals vendor to midnight tonight. Edelman announced Friday that 1.7 million shares had been tendered by the close of business Thursday, giving him control of a total of 2.8 million shares, or 19%, of Telex's outstanding shares.

Even if most of the company's shareholders accept Edelman's offer, however, the critical factor in determining Telex's future will be Edelman's ability to obtain financing for the estimated \$975 million takeover bid.

Edelman has expressed confidence that he will, but the fact that Telex stock has been trading only in the 50s suggests that shareholders are skeptical, according to one analyst who requested anonymity.

Telex closed last Thursday at 56½, up 3 points in heavy trading.

Mac attack

FROM PAGE 1

Computer Intelligence, a La-Jolla, Calif.-based market research firm. "Although Apple didn't have any big announcement, they sustained the level of enthusiasm that's been there all year."

Large numbers of Macin-

toshes have found their way into corporations like Hughes Aircraft Co., H. J. Heinz Co., General Electric Co. and Lockheed Missiles and Space Co. Other firms, including Avon Products, Inc., are currently evaluating Apple's new Mac SE and Mac II for what could be major purchases of those systems.

Currently, corporate accounts make up about 6% of Ap-

ple's revenue. The company's eventual goal is to boost that to 20%, officials said.

According to Bill Lempesis, an industry analyst at Dataquest Inc., Apple captured 8.8% of the domestic business market in 1986. He predicted Apple will gain 10% this year.

Lempesis said improvements in Apple's desktop publishing products and new engineering

applications expected to be written for Apple's Mac II, the most powerful machine in its line, should continue to fuel sales in the business environment.

The Mac SE and Mac II have silenced some objections to the Macintosh among corporate buyers because of their power and memory capabilities and their open architecture, which allows users to enhance them.

Products like AST Research, Inc.'s Microsoft Corp. MS-DOS-based coprocessor boards, which allow the new Macintoshes to run MS-DOS applications, have allowed MIS professionals to work around "DOS-only" purchasing guidelines, observers said.

In addition, Apple said it hopes the soon-to-be-released Macworkstation, a software product that allows the Mac to retain its own interface when connected to any host [CW, Oct.5], will offer further incentive for large corporations to consider Apple.

Saves training dollars

Corporations that have opted for the Mac cite its relative ease-of-use compared with an MS-DOS-based system as the primary incentive in going with Apple. The Mac saves training dollars, MIS executives said.

"If we had gone with any kind of DOS machine, we would have had to increase our training staff," said Jim Hayes, microcomputer manager at Seafirst Corp., a Seattle-based Bank-america Corp. subsidiary. Seafirst currently has 2,600 Macintoshes scattered throughout its Washington, D.C., branches. In comparison, it has only 200 IBM Personal Computer ATs and PC XT's.

Of Hughes Aircraft's 16,000 microcomputers, 5,000 are Macintoshes. Jack Baumann, manager of end-user consulting in Hughes's communications and data processing department, said the Macintoshes were purchased because of their ability to handle graphics. "It's easier to learn and use graphics on a Mac than on an MS-DOS machine with a graphics board," Baumann explained.

Baumann said Apple is still struggling to handle the needs of large corporations. "They've been a little slow to respond to us, but they're improving," he said.

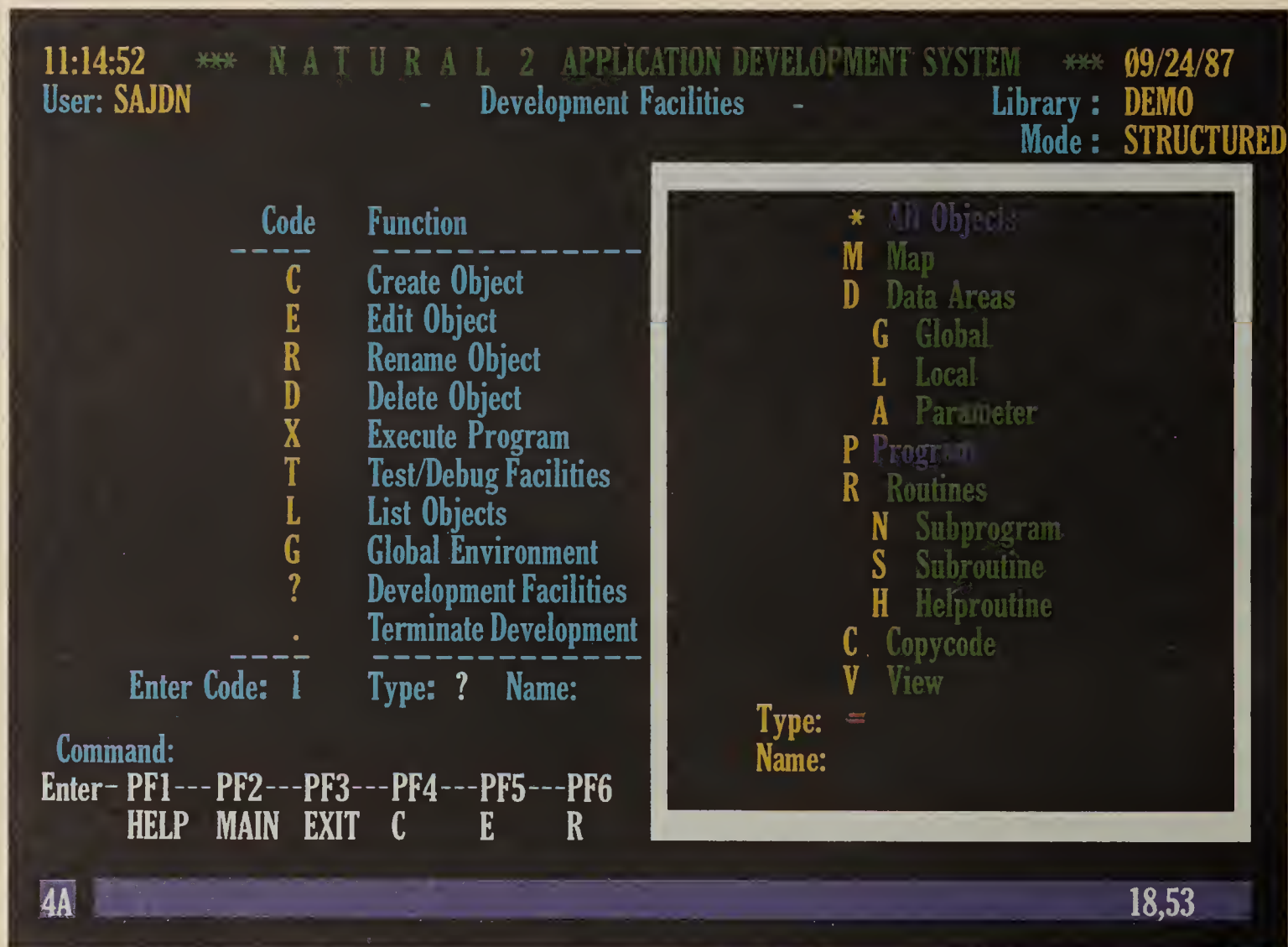
A tough sell

George Everhart, Apple's director of business marketing, admitted that selling to the Fortune 500 has proven to be a learning experience for Apple.

IBM's introduction of its PS/2 family will not hinder the Mac's acceptance in the business arena, Dataquest's Lempesis said. Unless IBM can come up with unique communications capabilities, competitors will continue to sell microcomputers that corporate users will connect to IBM mainframes. For some, the Macintosh will be that front end.

"The MIS director is always looking for a safe solution, and safe solutions mean IBM," said Rick Richardson, national director of Arthur Young's technology division. "But I think people are beginning to see there's room for more than one standard."

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	Buffalo	Dec 3
	Long Island	Oct 15, Nov 12
	New York City	Oct 7, Oct 21, Nov 4, Nov 10, Dec 2, Dec 17
	Rochester	Oct 22, Nov 18, Dec 17
	Syracuse	Oct 15
OH	Cincinnati	Oct 1, Dec 9
	Cleveland	Oct 15, Nov 12
	Columbus	Dec 8
	Dayton	Oct 20, Nov 17
OK	Oklahoma City	Nov 17
	Tulsa	Oct 20, Dec 8
OR	Portland	Oct 6, Dec 10
PA	Harrisburg	Oct 22, Dec 10
	Philadelphia	Nov 5, Dec 10
	Pittsburgh	Oct 20, Nov 4, Dec 8
SC	Greenville	Oct 14
TN	Knoxville	Nov 4
	Memphis	Oct 14, Dec 10
	Nashville	Oct 21
TX	Amarillo	Oct 13
	Austin	Oct 9
	Dallas	Oct 6, Nov 4, Dec 9
	Houston	Oct 16, Nov 18, Dec 10
	San Antonio	Oct 8
UT	Salt Lake City	Oct 29, Dec 10
VA	Richmond	Nov 17
	Virginia Beach	Oct 15
WA	Seattle	Oct 15, Nov 10, Dec 8
WI	Madison	Nov 12
	Milwaukee	Oct 14, Dec 3

CANADIAN SEMINARS

Calgary	Nov 18
Edmonton	Dec 1
Hamilton	Oct 20, Dec 15
London	Nov 17
Ottawa	Oct 1, Nov 5, Dec 3
Regina	Oct 27
Saskatoon	Nov 3
Toronto	Oct 13, Nov 10, Dec 8
Vancouver	Nov 12
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PC users building national net

BY JAMES A. MARTIN
CW STAFF

LAS VEGAS — About 100 members of IBM Personal Computer users groups met here last week to consider a proposal for a nationwide organization that would link PC users group members through an electronic bulletin board system.

While no official actions were taken at the meeting, which was held at Comdex/Fall '87, users group officials said a final strategy for implementing the communications network is expected to be announced at a similar meeting during Comdex/Spring '88 in Atlanta.

The proposed bulletin board would enable PC users groups to share and update membership lists, exchange product reviews and newsletter articles, solve common technical problems and develop contacts among other groups.

Growing up

PC users groups have proliferated recently. Some estimate there are as many as 500 such groups nationwide, but there have been no formal attempts to pool resources to form a unified voice.

Users groups are maturing in sophistication and now carry considerable clout in the PC marketplace, users group officials said.

"Vendors are understanding that users groups are a prime way to get their points across to users," said Dan Ehrmann, the immediate past president of The Chicago Computer Society. "But there have been so many users groups, the vendors just didn't know how to do it. The fact that we want to set up an organization gives them a lot of encouragement."

With better user-vendor relations, users will have more access to product development information and beta testing, while vendors will benefit from user input before a product is released.

"If IBM had had an end-user advisory group, there would have never been a PCjr or Convertible," said Jerry Schneider, president of the Capital PC User Group, Inc. in Washington, D.C., in reference to two of

IBM's less successful microcomputers.

Talk of developing a national users organization — the main focus of which would be the bulletin board — began in earnest at a recent meeting of some 40 users group officials sponsored

by Microsoft Corp. at its Redmond, Wash., headquarters, according to Schneider.

"We weren't ignoring the users groups, we just didn't have any formal relationship with them," Microsoft Chairman Bill Gates said at a reception follow-

ing the forum. Microsoft is planning a second, more expansive users group meeting at its facilities next year, Gates added.

Meanwhile, IBM has moved its end-user communications functions from its marketing division in Boca Raton, Fla., and has integrated them into the National Distribution Division's National Support Center in Atlanta.

The move apparently was de-

signed in part to enable IBM support staff to answer users group members' queries, either directly or through IBM's Electronic Bulletin Board System.

Users attending the meeting expressed guarded optimism as to whether a national organization will be created and whether better vendor relations and intergroup communications would result.

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Bell firm appeals info service ruling

BY KATHY CHIN LEONG
CW STAFF

Confident that it can be a success in the unregulated arena, Bell Atlantic Corp. is working to appeal a U.S. District Court ruling that bars telephone companies from offering computerized Yel-

low Pages and other information services to customers.

In September, U.S. District Judge Harold Greene ruled that Bell companies could provide the transmission vehicle to deliver information services but could not provide content. Now, Greene is expected to clarify

that ruling to specify the type of services the Bell companies can offer.

Bell Atlantic Chairman Thomas E. Bolger told securities analysts in New York last week that company lawyers are preparing an appeal of the original decision. If a service were to be

offered, Bell Atlantic would take advantage of its existing packet-switching network to allow customers to dial into its own phone number data base.

"Mr. Bolger believes that Bell companies have a right to exercise our First Amendment right to publish," Bell Atlantic spokesman Tom Healey said.

Dispelling skeptics' views that regional Bell holding compa-

nies would not succeed in businesses other than voice communications, Bell Atlantic also disclosed last week positive financial results for all of its nonregulated subsidiaries for the first time, making it the first of the seven Bell companies to do so.

Moving out front?

Bell Atlantic appears anxious to become the dominant information services player among the holding companies. In a separate announcement also made last week, the company said it intends to acquire several computer-related businesses from Bell Canada Enterprises, Inc.

After a strong \$2.6 billion third quarter ending Oct. 31, Bolger told analysts the company will likely meet its net income growth estimates of 6% to 8% this year. The nonregulated companies under Bell Atlantic Enterprises, he said, will account for one-third of that growth. Those companies include the Customer Services group, which includes Sorbus, Inc., cellular company Bell Atlantic Mobile Systems and leasing company Bell Atlantic Capital Corp.

For the first three quarters, the companies reported total sales of \$643 million and posted profits of \$29 million. Mobile Systems showed revenue of \$62 million, the Customer Services group showed revenue of \$243 million, and Bell Atlantic Capital reported \$326 million in revenue. According to Raymond Smith, Bell Atlantic's chief financial officer, the unregulated business will generate revenue of approximately \$875 million by the end of this year with net income of \$45 million.

With expectations of strong growth through expansion, the company said it has signed a letter of intent to acquire Bell Canada's European subsidiaries involved in computer maintenance and custom software. The purchase value was not disclosed.

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Cadds line to use Sun station

BEDFORD, Mass. — Computervision Corp. is expected this week to announce it will incorporate the high-end 10-million instructions per second Sun Microsystems, Inc. workstation into its Cadds product line next year.

Computervision has been selling its computer-aided design and manufacturing software on the Sun platform since last year. That introduction culminated a massive software conversion project to move from its proprietary hardware platform to the Sun environment.

The high-end Sun-4 series is based on the Sun proprietary Scalable Processor Architecture (Sparc) for supercomputing workstations. Recently, both AT&T and Xerox Corp. licensed the technology.

The Sparc systems are reportedly source code-compatible with the other systems in the Sun product line.

Computervision said it will offer upgrade packages for current users when it introduces the new system in mid-1988.

IBM banks on options for PS/2s

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — Fulfilling a promise made earlier this year, IBM unleashed a series of products last week aimed at integrating the Personal System/2 into banking applications.

Several products allow the PS/2 to work with the IBM 4702 Branch Automation Processor. Previously, IBM Personal Computers or compatible microcomputers could be used with the system.

IBM also brought the 4702 into its Token-Ring local-area network (LAN), fulfilling a promise made in the spring. PCs and PS/2s connected to a Token-Ring LAN can gain access to information on the 4702 for use in spreadsheets and other applications, an IBM spokesman said.

IBM also announced the PS/2 8530 Models R02 and R21 bank teller workstations. Both are PS/2 Model 30s with a 50-key keyboard intended for use by bank tellers, IBM said.

A teller's personal computer software package was unveiled along with a bank manager's PC software package intended for use with a bank's central data base.

IBM also announced the 4732 automated teller machine to replace its previous 3624 ATM device. The 4732 reads and cashes checks and dispenses coins. The technology used in the machine had previously been offered in a bank lobby device and has now been adapted to ATM uses.

IBM also announced a new 3892 reader-sorter for community banks. The machine is capable of processing 1,000 checks per minute. An earlier reader-sorter for community banks, which will still be offered, can handle 400 checks per minute.

IBM ready to tie MAP-VM knot

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM announced plans last week to provide its first Manufacturing Automation Protocol (MAP) link for its VM operating system. MAP-VM Support and MAP-Channel Support are scheduled for availability in mid-1988. The software offerings will reportedly connect any IBM 370 system running VM to a MAP 2.1 network.

The products are intended to work with the Industrial Networking, Inc. MAP Adapter, which IBM remarkets, and the IBM 8232 LAN Channel Station, which

serves as the gateway between the host computer and the MAP environment. The 8232 LAN Channel Station is based on a ruggedized IBM Personal Computer called the IBM Industrial Computer.

MAP-VM Support resides on the 370 host and ranges in price from \$18,000 to \$72,000. Release 1, scheduled for availability in June 1988, includes an implementation of the Common Application Service Elements kernel as specified by MAP 2.1, the company said. Common Application Service Elements is an ISO protocol that identifies the basic elements to allow data to be transferred from application to application.

Release 2, scheduled for shipment in September 1988, is said to include an implementation of the MAP 2.1-specified Manufacturing Messaging Specifications.

MAP-Channel Support is software that serves as the bridge between the various pieces of hardware and the host. The software carries a one-time charge of \$5,000 and is scheduled for availability in June 1988. The 8232 LAN Channel Station, which costs \$18,385, connects to the MAP network with an Industrial Networking MAP Adapter, which costs approximately \$4,000. The gateway system connects to the host via the host's channel-to-channel adapter.

MAP-Channel Support software establishes the connection between the 370 and the MAP network.

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Cimlinc continues CIM transition, adds tools

Unix-based 3-D, numerical-control packages set to bow at Autofact '87

CHICAGO — Cimlinc, Inc., a \$34 million provider of computer-integrated hardware and software, is announcing two software packages at this week's Autofact '87 show in Detroit.

The packages — one for three-dimensional modeling and the other for numerical-control applications — were designed for use on 32-bit engineering workstations based on the Unix operating system. Cimlinc, a 6-year-old company based in Elk Grove Village, a suburb of Chicago, is making a transition from workstation manufacturer to developer of Unix-based

computer-integrated manufacturing, or CIM, software.

CIM CAD3D will be the new basis for all future 3-D modeling packages released by Cimlinc, according to company spokesman Jack Thornton. The software will reportedly allow users to map existing two-dimensional drawings into 3-D versions for solid or wire-frame modeling.

The second package, CIM Cut, will allow users to run numerical-control programs for metal-cutting machines on 32-bit workstations such as those from Cimlinc or Sun Microsystems, Inc., located in Mountain View, Calif. "You could do these kinds of things before," Thornton said, "but it might have taken a mainframe to do them." New algorithms in the CIM Cut package reportedly allow for a high degree of data compression so that a workstation or Unix-based minicomputer with 16M bytes of main memory could support the application.

CIM CAD3D is priced at \$8,995 per workstation, while CIM Cut is priced at \$7,795 per workstation. Both packages are fully compatible with previous Cimlinc software releases, Thornton said.

ADAPSO, IIA scotch merger but link arms

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — ADAPSO, the computer software and services industry association, and the Information Industry Association (IIA) have agreed to work together on a variety of activities, but the organizations have put aside plans for a full-scale merger.

As a result of the merger discussions [CW, June 1], the associations have formed a Joint Government Relations Committee to address common government issues and a Joint Events Committee to coordinate seminars and a joint conference in May 1989.

"The business significance of merging activities is that these activities will bring top executives of software and systems companies together with their counterparts from information companies," said Daniel M. Sullivan, president of Frost & Sullivan, Inc. and this year's chairman of the IIA.

Breakthroughs predicted

"Business as well as technological breakthroughs are certain to follow" from the interaction, Sullivan said.

For example, the merger talks triggered an agreement between Comshare, Inc. and Dow Jones & Co. that will provide corporate users of Comshare's Commander Executive Information Systems with access to the Dow Jones News/Retrieval service.

Richard Crandall, chairman of Comshare and an ADAPSO member, and Carl Valenti, vice-president of Dow Jones and an IIA member, first met while serving on the ADAPSO-IIA merger task force earlier this year.

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Washington high-tech trade center bucks odds

BY GLENN RIFKIN
CW STAFF

Despite the limited success of information industry trade centers, construction is underway on Techworld, a \$342 million, 2.5 million-sq-ft trade center in downtown Washington, D.C.

The massive complex, located directly across the street from the Washington Convention Center, is the work of International Developers, Inc. (IDI), a Washington-based development firm, and is scheduled for completion in May 1989. IDI is convinced that Techworld can succeed where others have failed. The rea-

son: It is located in the heart of a \$25 billion information technology marketplace.

In the age of overdone marketing hype, Techworld has purposely been kept low-key by IDI. Instead of blaring promises and predictions, Techworld, whose construction was begun in January, has quietly sought out major technology vendors to commit to occupancy when the facility opens.

Techworld already has commitments from AT&T, Xerox Corp. and NCR Corp. to take space, and Alan Bogatay, Techworld's senior vice-president of marketing, claims that both IBM and Apple Computer, Inc. are close to signing up. Thus

far, more than 500,00 sq ft of space is in one stage of commitment or another.

According to Bogatay, the reason for the subtle approach is that the project was tied up in district courts for three years while lawyers haggled over land rights, zoning and other issues. In the midst of the bureaucratic dickering, the project was sued by local preservationists over its architectural design. Eventually, an act of Congress was needed in order to get the project approved.

"At that point, we decided to just dig in and do it," Bogatay said. "We wanted to keep it low-key."

Bogatay admits to another reason for

the apparent caution. Heavily hyped Techworld-like trade centers, such as Dallas's Infomart and Boston's Boscom, have had less than expected success. Boscom, in fact, never opened, and a scaled-down version was folded into Boston's World Trade Center.

Despite those disappointments, Bogatay is confident that Techworld can succeed. Aimed at the federal government marketplace for information technology, which he estimates is a \$25 billion annual business, Bogatay says Techworld has several advantages over Infomart.

The key differences, he points out, are the following:

- Washington, due to its government presence, is a vastly larger market than Dallas. The local area represents the largest information services marketplace in the world — an estimated 15% of the total U.S. domestic market.

- Techworld offers a better location than Infomart. Techworld is situated halfway between the Capitol Building and the White House. According to Bogatay, Techworld is within walking distance of 50 federal offices. Infomart, he says, is "neither in town nor out of town in Dallas" and is at least a mile from the Dallas Convention Center.

- After "tracking carefully" the progress of Infomart, the Techworld developers learned from its mistakes. Techworld, for example, is much more of a mixed-use facility. Infomart is essentially a million-sq-ft showroom. Techworld will have 250,000 sq ft of showroom, but it will offer three times as much office space to potential tenants. It will also have two levels of conference facilities, 100,000 sq ft of retail space for travel agencies, banks and office supply outlets, a 2,000-car parking garage and an 800-room Ramada Renaissance hotel.

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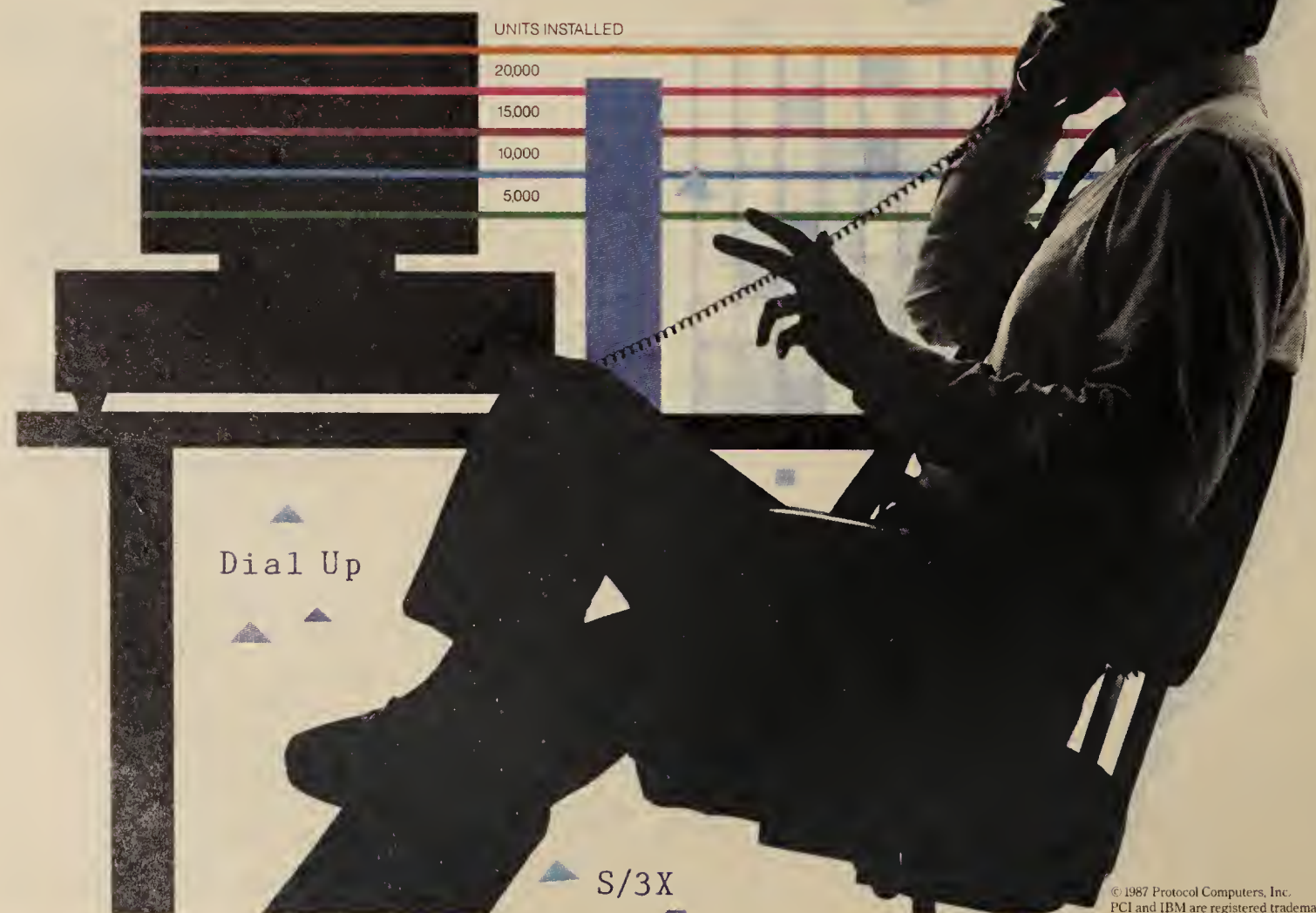
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Sorbus to service DEC hardware

LAS VEGAS — Sorbus, Inc., the Bell Atlantic Corp.-owned maintenance firm, last week announced it will offer maintenance service for Digital Equipment Corp. hardware and will now provide financing for computer purchases through Bell Atlantic leasing subsidiaries.


The announcements, made at Comdex/Fall '87 here, position Sorbus as the only independent single-source organization that can provide both maintenance and financing in one contract, according to Thomas Ryan, senior vice-president of leasing at Bell Atlantic Systems Leasing.

Through the new program, DEC service will include guaranteed four-hour response time, multiyear service agreements and diagnostic capabilities, according to William Patch, Sorbus vice-president of marketing and planning.

DEC equipment to be serviced includes the PDP-11 series, the Microvax I and II and the VAX 11/7 models. Sorbus is currently claimed to be the largest independent maintainer of IBM equipment in the U.S.

Through the company's computer leasing program, contracts with fixed-price maintenance for the terms of the lease will be available. The announcements take effect Jan. 1, but Ryan said the companies would not turn down contracts now.

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EDITORIAL

Integration blues

IBM WILL END months of anticipation with the shipment of the first version of its OS/2 operating system next month. But for MIS organizations, the questions may be just beginning.

At a time when standards are on the minds of every information systems manager, OS/2 throws another ingredient into the soup. For all its advantages — access to large memory spaces, multitasking and virtual-memory management — OS/2 is a very different operating system from its PC-DOS predecessor. While it has some compatibility with PC-DOS, it is not a given that PC-DOS users will migrate to OS/2. As such, OS/2 adds a degree of incompatibility to an environment already awash in competing standards. Soon, it may be common to see different CPUs within a single department running PC-DOS, OS/2, various flavors of Unix, Apple's Macintosh, DEC's VMS and IBM's VM. What's more, all may be running different versions of Lotus's 1-2-3.

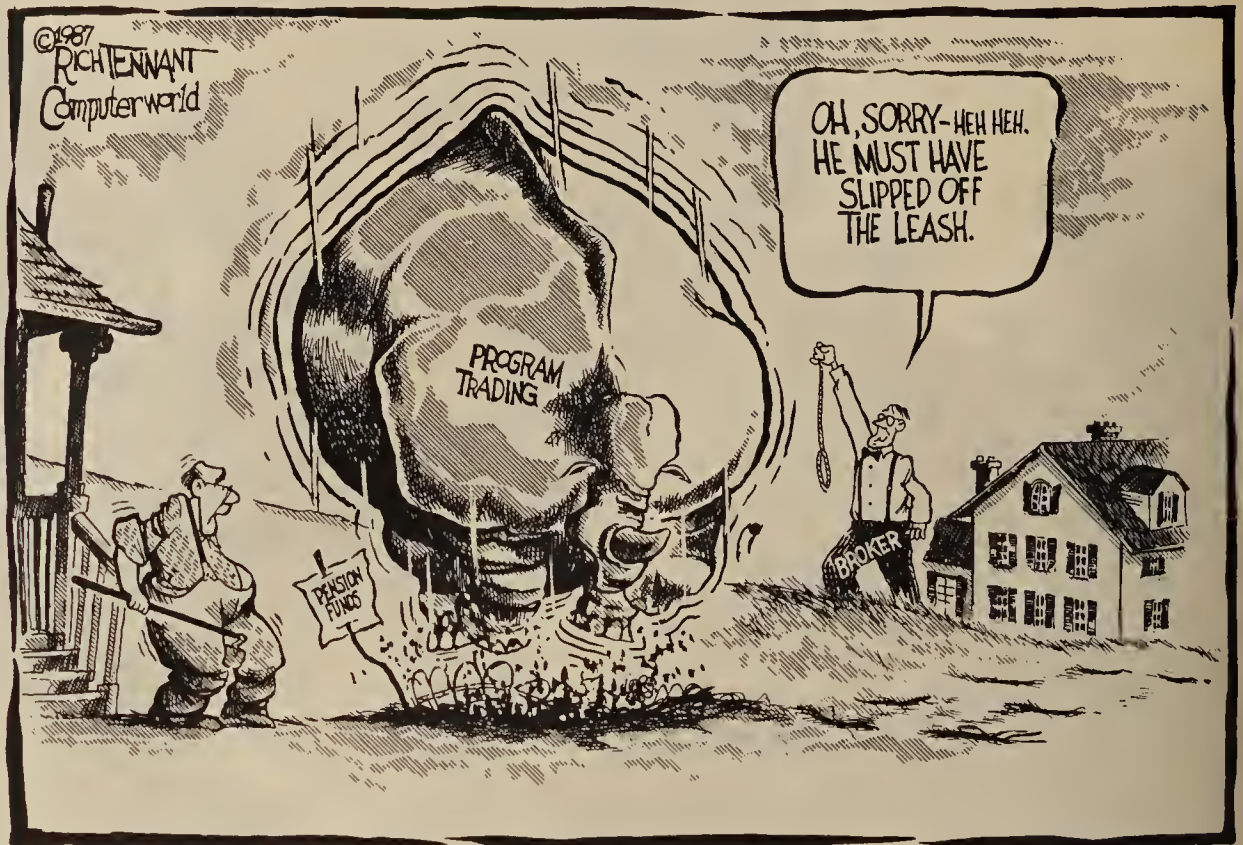
This emerging melting pot may be a dream for users, but for MIS it has the makings of a nightmare. Not only will MIS departments need to distribute, track, maintain, upgrade and educate users on a half-dozen different operating systems, but it will need to do so for each major application as well.

Such problems cannot be solved by user organizations alone. It is up to the vendor community, particularly IBM, to lend its support.

For starters, IBM needs to better define its attitude toward the departmental systems it now touts so boldly. The company casually announced plans last week to introduce a version of the Unix operating system next year that supports up to 16 users on a Personal System/2 Model 80. Taken with the RT Personal Computer, System/36 and low-end 9370, IBM now offers four different hardware bases and three incompatible operating systems to handle this critical work group environment. If IBM cannot make up its mind about what it wants to do in this area, how can users be expected to do the same?

Software providers must also take a more active role in helping their customers track and pay for software products. In a mixed operating system world, per-CPU pricing will rapidly become outmoded. The industry needs to rejuvenate the site licensing concept, but with an emphasis on managing software use rather than just discounting prices. Lotus has done some interesting exploratory work in electronic distribution and control. Such efforts should be more aggressively pursued.

Finally, the industry must turn its attention to the issue of managing multiple operating system sites and away from chasing after new technologies. The current suite of operating software offers vast opportunities for strategic applications, particularly when micros, minis and mainframes are leveraged for cooperative processing. The time has come to apply the same kind of innovative effort to integration as has been applied to hot new products in the past.



LETTERS TO THE EDITOR

A little too far?

I really enjoyed your 20th annual "the mainframe is dead" article ["What threatens mainframe computing?" CW, Oct. 19], especially since the author clearly showed a wealth of practical experience in the mainframe and micro worlds. I wholeheartedly agree with Viskovich that powerful micros, such as IBM's Personal System/2 Model 80, offer much better price/performance than mainframes such as IBM's 3090-600E. One can see that a 75-million instructions per second (MIPS) 3090-600E can be replaced economically by several 2.2-MIPS PS/2 Model 80s.

However, I don't think Viskovich went far enough. Pocket calculators offering 0.1 MIPS can be had for a few bucks each; 750 such calculators yield the processing power of a 3090-600E model for much less than \$10,000. Clearly, these are even more cost-effective than PS/2 Model 80s.

I encourage Viskovich to pursue development of his concepts to a working prototype. I am sure IBM, as well as plug-compatible manufacturers, would be interested in the resulting technology, since IBM has pushed the limits of existing multiprocessor technology with the six-processor 3090-600E.

Our company would certainly be interested. I am eagerly anticipating the day when we will see several dozen PS/2 Model 80s or a thousand pocket calculators lashed together, handling the processing load of our 4,500 IBM CICS/IDMS users, 250 TSO users and 60 or 70 other simultaneous tasks.

I am undaunted by the prospect of cabling 250G bytes of 3380s to the micros and sharing

data bases among them. Our throughput now is only about one million transactions per day with response times of a few seconds; perhaps we'll be able to improve that.

Indeed, why stop with computers; the same approach has potential outside of data processing. The trucking industry, for example, should examine the replacement of all of those expensive 18-wheelers with a swarm of smaller, less-expensive pickup trucks. The mind reels with the possibilities.

Joseph A. Vincent
Director of Computer
Performance and
Capacity Planning
Humana, Inc.
Louisville, Ky.

This week in history

Nov. 7, 1977

A survey of 30 MIS directors has found that, although a few pioneers are starting to use distributed processing techniques to shape their networks for optimum economic and managerial advantages, most users are still skeptical of distributed processing.

Nov. 8, 1982

Honeywell, Inc. plans to lay off 1,850 employees in its Information Systems Division by Dec. 2, bringing to 3,000 the total number of employees furloughed this year. The layoff will primarily affect staff not directly involved in selling, servicing or manufacturing the product, the company says.

Feels left out

Your front-page pie chart, "Plugging in" [CW, Oct. 19], has me feeling left out. We have 14 Digital Equipment Corp. VAX systems that are neither stand-alone, Decnet nor Vaxclustered. Your information provider must be wearing single-vendor blinders. We use Transmission Control Protocol/Internet Protocol.

Jim Haynes
Associate Development
Engineer
University of California
at Santa Cruz
Santa Cruz, Calif.

Not our job

According to the author of the front-page story "Stock crash thrashes CPUs, operators" [CW, Oct. 26], "... New York's Securities Industry Automation Corp. announced that it would close trading at 2 p.m. ... to process backlogged orders for the NYSE and Amex."

As the data processing subsidiary of the New York and American Stock Exchanges, we are not empowered to determine trading hours. Only the executives of both exchanges may decide when their trading floors open and close.

Mark A. Karp
Manager of Data Base
Administration
Securities Industry
Automation Corp.
New York

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Holding a mirror up to nature

Fractal programming helps science prove that nature isn't 'natural' and that its existence can be explained with the principles of mathematics

HARVEY NEWQUIST



If you look at the monitor screens of various workstations lately, you will more than likely be shown at least one graphic demonstration of some fabulously colored wild shapes that look like a lunatic's attempt at geometry.

These shapes resemble spirals, snowflakes or, in the case of the Apple Computer, Inc.'s Macintosh II's new Fractalstein program, rainbows as processed by a Cuisinart. At their most useful, these computer-generated shapes resemble mountain ranges, trees, topographic maps and continental coastlines, and they are helping computer science explain nature.

They are fractals.

Fractals are important because, with the aid of computers, they are helping science do what it has always wanted to do: Show that nature isn't simply "natural," that its existence can be explained by mathematical principles.

Although a relatively new phenomenon, fractals are already changing the face of computer modeling, graphics and design. Fractals allow users to create lifelike mountains depicted in recent IBM ads.

In fact, IBM's Watson Research Center gave this technology to the world. In 1982, Benoit Mandelbrot, an IBM Research Fellow, published a book called *The Fractal Geometry of Nature*, the culmination of more than 20 years of study of the shapes that occur in nature.

Real-world geometry

Mandelbrot saw that Euclidean geometry (isosceles triangles, parallelograms and the like) was clearly ill equipped to deal with natural forms such as clouds, mountains or lightning bolts. There is a geometry of the real world that is irregular or fragmented — hence "fractal."

The basis of Mandelbrot's study was that forms and shapes were too often limited when one imposed strict geometric principles to them. For instance, he

reasoned, wouldn't a coastline be much longer if you could measure the land by the millimeter instead of the mile? When we measure it by the mile, we don't take into account those minute curves of inches, feet and yards.

Mandelbrot believed that this irregularity of a natural form might make sense if it was viewed in light of some other natural forms, particularly the snowflake. In 1964, using a principle discovered many years earlier, Mandelbrot noticed that snowflakes were actually geometric extensions of smaller ver-

fractal geometry.

How was Mandelbrot able to express his ideas to colleagues and skeptics? By creating images on graphics workstations of such fractal phenomena as mountains, planet surfaces and river valleys. The graphic workstation market is now helping to perpetuate the use of the geometry that it helped to stimulate.

Many of the advances made in computing at all levels in the past two years had to do with the increased graphics capabilities of machines ranging from micros to mainframes. Part of the reason for this interest is the need to model and manipulate objects with a computer and without having to subject a real version of the object to wind tests, fluid dynamics and multicolored paint jobs.

However, a limitation of computer-aided design or graphics is that most of the objects in question must lend themselves to being stripped down to geometric wire-frame models. You've seen these in depictions of race cars, the space shuttle or something as simple as a nut and bolt.

Rust patterns

The world doesn't work well within the confines of Euclidean geometry, though. That rust pattern that eats around your car's wheel well? Non-Euclidean. The microscopic porousness of the space shuttle's heat-resistant tiles? Non-Euclidean.

Standard geometry only allowed computer designers to deal with objects above a certain level of definition. Trying to simulate the branching of an oak tree or the winding of a river proved to be completely out of the question.

Enter some pretty amazing programming pioneered by one of Mandelbrot's IBM associates, Richard Voss.

Voss designed programs that could take the basic fractal unit — an irregular curve or wavy line — and multiply it at an incredibly fast rate in order to produce a completed mountain or coastline. Such computer programming has produced realistic pictures of planet surfaces or mountain faces that don't really

Continued on page 22



CHRISTOPHER BING

sions of themselves.

Upon close examination, a snowflake's tiniest segments reveal themselves to be the same shape as the whole snowflake. This concept can best be understood by imagining an enormous pyramid constructed of lots of little pyramids; even the tiniest pyramid retains all of the characteristics of the completed larger one. This idea, known as self-similarity, is one of the basics of

What is the value of being creative?

WILLIAM HARRISON

Forcing the mind to look at things differently is a basic concept of Taoism, a philosophy developed in China several thousand years ago.

One example is the "koan," a saying that appears to contain a contradiction. A novice aspiring to become a monk was required to meditate on a koan until he understood the meaning. The following is an example: "We all know the value of being useful. What is the value of being useless?" The typical mind adopts a structured approach to the question. Useful is good. Useless is bad. The koan must be invalid. The more the koan is studied, the more invalid it seems.

The answer — "It is good to be useless in the service of a man who plans evil" — has a slingshot effect on the mind. The radical mental shift that occurs is similar to what happens when creativity is forced through accident or motivation.

Understanding the creative process makes it more likely that we can cause it to happen when it is needed in areas such as software programming. The words creativity and programming are almost automatically associated.

Harrison is an engineering manager at Siemens Information Systems in Boca Raton, Fla.

Gimme an M! Gimme an I! Gimme an S!

GLENN RIFKIN



Michael Simmons looked drawn and weary as he got up to speak. That wasn't unexpected after the week he'd spent as president of Fidelity Systems Co., the MIS arm of Boston-based Fidelity Investments, Inc. He figured he'd managed about 20 hours of sleep in the past week as the stock market crash pushed investment firms to the brink of chaos.

Nevertheless, Simmons showed up to keynote a forum on MIS education at Suffolk University in Boston because the subject is near to his heart.

Fidelity's MIS department

Rifkin is a senior editor at *Computerworld*.

Every software department has experienced the phenomenon of creative insight that eliminates the need for many lines of code or facilitates the porting of thousands of lines of code from one project to another. Creativity is perhaps the single most important factor related to success in software engineering.

'Meeting monopolizers'

Management typically is very aware of the importance of creativity, but most companies lack a strategy to foster it. This lack can be attributed to the vague understanding that almost everyone, including management, has of what creativity is. Serious problems can result, like mistaking a "meeting monopolizer" for a creative person.

An obstacle to understanding and achieving creativity is structure. Software engineering by definition must be structured. A large software engineering project would be impossible to complete without structure's stability.

The gateway to creativity begins to close once the conscious mind perceives that a structured solution has been already been applied. There is, however, a unique state of mind that is receptive to creativity even after a structured solution is in place.

Abraham Maslow, a behaviorist

Continued on page 22

has been operating at more than 100 people short for three years. Even with extensive hiring this year, the company can't find enough qualified MIS professionals to fill its needs. This is a tough situation to manage under normal Wall Street conditions; for the week of Oct. 19, that shortfall turned an ordeal into a nightmare.

The affable Simmons is rightly concerned about the state of MIS education in this country. Business schools and computer science programs are not turning out enough quality candidates for all the open positions. And the situation seems to be getting worse, despite the best intentions of academia.

The crisis in education, as *Computerworld* called it in a two-part series [CW, June 15], is not the burden of colleges alone. Industry must share the responsibility of finding a solution, Simmons emphasized in his address. However, industry may not be getting the message, if the attendance at this local forum was any indicator. Name tags revealed that the majority of the attendees came from local colleges;

Continued on page 22

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Nature

CONTINUED FROM PAGE 21

exist except in the CPU of a computer.

Utilizing these programming techniques, numerous laboratories around the world are now using workstations to simulate shoreline erosion, earthquake faults, coral structures, tree formations and even oil deposits. There is no way a single human being could ever have taken a basic fractal component and expanded it manually to create an entire object or environment. We would be reminiscing about the good old days of OS/2 before a human researcher had made a dent in such a project.

So we've seen how fractals and com-

puters working together helped create an entirely new — and valid — form of mathematics. The benefit is mutual: Fractals allow the computer industry to examine an area heretofore restricted from intense computational study — nature. And of course, computers allow fractals to be simulated.

So what about those neat patterns you see on everything from Apollos to Suns to VAXs to Macs that look like a lava lamp spilled on a kaleidoscope? The swirling shapes that seem to belong in a scene from *The Time Tunnel*? Well, to my mind, this use of the computer may be one of the most advanced thus far conceived.

These shapes, known as Julia Sets and Mandelbrot Sets, are computer representations of dynamic fractals, whereby a

random constant or simply a '1' is added to the equation. The resulting images are something never before created by or seen by humans. As a matter of fact, humans who could have even imagined such intricate forms and shapes would probably have been locked up by court order as recently as a decade ago.

My point is that fractals provide a realm whereby computers become the only way to express what a human has designed. The fractal equations are completely human; the representations are completely technological.

No human can translate or draw an expanding fractal into a specific scene; it requires a computer to generate such a picture. The computer becomes a necessary extension of the human thought process.

Creativity

CONTINUED FROM PAGE 21

ioral psychologist, uses the phrase "innocent cognition" to describe a healthy state of mind. He refers to it as "perfect waiting."

Throughout life, we find ourselves making decisions and taking actions that cause a degree of uncertainty. We never know exactly what the result of our action or decision will be. Some examples are submitting a paper to a conference, starting a cost reduction program or recommending a new methodology. All will produce uncertain results. Even the simple act of saying "Good morning" has an uncertain outcome — what will the other person say?

Anticipation of a negative response in business can cause a manager to halfheartedly propose a strategy or timidly start a program. The anticipation of a negative response becomes self-fulfilling.

Management can unwittingly prevent people from acting in an innocent cognitive mode. If all proposals are greeted with a negative response or an "I'm too busy" reaction, there will be few proposals and even fewer creative proposals forthcoming. Even though only one out of 10 new ideas will pay off, management must make everyone aware that it appreciates the submission of the other nine.

Management must always attempt to state problems in the most general way — without implying a solution. Management's interest in creativity must be genuine. If employees believe that interest is a facade, the existing creativity will disappear. Management must do whatever it can to foster employees' innocent cognition — that healthy state of mind that is basic to creativity in programming as elsewhere in life.

Gimme an M!

CONTINUED FROM PAGE 21

Boston-area companies were sadly underrepresented.

The issues, mountainous in scope, range from the loss of qualified business students to Wall Street to finding a balance between technical and business skills in graduating students. What was clearest is that MIS suffers an image problem, and it is going to take a massive public awareness effort to change that.

Attracting students already college-bound may be like shutting the barn door after the horse is gone. High school students (and their guidance counselors) must be made aware that MIS can be an exciting and rewarding career path.

At the Suffolk forum, local groups such as the Boston chapter of the Society for Information Management offered their services to help address the issues. But those efforts, while commendable, are like trying to douse a bonfire with a glass of water.

MIS professionals must take their cue from people like Simmons. They need to get out from behind their desks and work with the local academic community, as well as their professional associations, to stir up interest in MIS as a career.

Simmons, in fact, left the forum early to catch a flight to Indiana, where he spoke to students at Indiana State University in an attempt to ignite some Hoosier hysteria about MIS.



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S O F T T A L K

Anthony Reed

Developing end users

The success or failure of a system development life cycle depends on how well an analyst's previous training provides a road map for the analyst and other technical personnel.

Unless the user is actively involved in the development process, however, the project will fail.

Users feel alienated during the development process. They hear their functional area described in unfamiliar computer jargon during walkthroughs while being expected to actively participate in the conversations. Often, they're too afraid to ask questions because they don't want to appear stupid.

They begin to withdraw into their own familiar world and become too busy to help the analyst design the system.

Don't know the rules

This problem occurs because we don't prepare the user for the system development process. Since the users don't know the rules of the game, they feel uncomfortable as players. In short, the users feel "used."

A user-orientation phase in a system development life cycle will help minimize the user's feeling of alienation and improve the system's quality while low-

Continued on page 35

Financial adviser goes on-line

Insurance firms test Applied Expert Systems' client profiling software

BY CHARLES BABCOCK
CW STAFF

NEW YORK — An expert system from Applied Expert Systems, Inc. that profiles clients' financial needs is currently being tested at John Hancock Mutual Life Insurance Co. in Boston and New York Life Insurance Co. in New York.

Mark P. Gaynor, vice-president of corporate planning and development at New York Life, says the expert system will be

loaded onto his firm's Digital Equipment Corp. Microvax in a Midwest office and onto insurance agents' IBM Personal Computers in field offices. The agents will use the system for a two-month period to evaluate clients.

At the end of the period, New York Life says it wants to ask its financial planners if the expert system's recommendations are similar to what they would recommend.

"The agent needs help in

making a determination of what products are appropriate," Gaynor notes. Since most agents today are independent rather than company employees, an expert system that helps them sift through the myriad of financial products available today "will help bind them to us," he says. Forty-five agents will be included in the initial test.

Applied Expert Systems, a Cambridge, Mass., firm, is an experienced developer of financial

Continued on page 33

Newcomers heat up VM market

Two newcomers to the VM systems software market are going after the major player in this arena, VM Software, Inc., with on-line backup programs that will compete against VM Software's aging batch-oriented backup system.

Sterling Software, Inc.'s System Software Marketing Division introduced DMS/VM late last month, a package that includes a backup program as well as an archival and tape management facility.

Diversified Data Resources, Inc. in San Rafael, Calif., began shipping VM/Quarterback, a backup and recovery package.

Both companies claim to have advantages over VM Software's VMBBackup. Sterling claims it outdoes the VM Software product with its technology, while Diversified Data points to a price advantage.

VMBBackup was introduced in 1981 and has built up a user base of 1,800, according to a company

Continued on page 26

AN INSIDER'S LOOK

Adding mainframe expertise

BY A. PERRY SCHWARTZ
SPECIAL TO CW

With last month's announcement of Knowledgetool [CW, Oct. 26], IBM provided significant new expert system capabilities for its 370 environment.

Knowledgetool is one of the few commercial expert system tools that can be effectively integrated with IBM mainframe data processing applications.

Knowledgetool is compatible with IBM's VM/SP and MVS/XA environments and has specific support in that firm's CICS 1.7, IMS and DB2.

Since 1985, I have been a consultant to IBM's artificial intelligence project office. Over the past year, I was asked to review and

Continued on page 32



FRANKLIN HAMMOND

Inside

- Viasoft integrates analysis tool, ISPF editor. Page 26.
- Data Language upgrades fourth-generation language, relational DBMS. Page 30.
- American Software releases data center problem management system. Page 37.

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Viasoft enhances Cobol analysis tool

BY CHARLES BABCOCK
CW STAFF

PHOENIX — Viasoft, Inc. recently integrated its Cobol program analysis tool, Via/Insight, into IBM's ISPF editor so that a programmer using the product can make and test changes to a

program as he tracks its logic.

Via/Insight Release 3.0 is the mainframe product first introduced in mid-1986 that had earlier been selected for the General Services Administration's Federal Programmers Workbench. In June 1986, the \$60,000 product had 21 customers and now

has 83, according to Kent Petzold, Viasoft's president and chief executive officer. It is now priced on a graduated basis from \$45,000 to \$69,000.

Richard Harrison, director of the Federal Software Management Support Center in Falls Church, Va., said Via/Insight

"offers the highest rate of return in increased productivity" of the maintenance tools that he has seen. "It's the one I would pick if I could only choose one," he said.

"Some programmers want to try changes as they go or try 'what-if' things," Petzold noted.

In earlier releases, a programmer had to switch back and forth between the program analysis software and the ISPF edi-

tor in order to test a variable in a program, he noted. The product is now a primary menu option under ISPF.

Via/Insight can track a field name in a program and all cross references to it so that changing the name in one location can be duplicated in all other locations, according to Petzold.

Potential changes to the program can be tested using Via/Insight by inserting a variable and then tracking its path through the program to see whether it yields the intended results, Viasoft spokesmen said.

Lt. Col. John Shade of the Defense Logistics Agency, a user of the Federal Programmers Workbench, said his agency expects to save \$1.5 million in Cobol maintenance costs over five years by using the product.

Via/Insight runs with ISPF/Program Development Facility 2.0 and under IBM's MVS or MVS/XA.

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Newcomers

FROM PAGE 23

spokesman. A major rewrite has been in the works to bring the product up to date. The new release is expected in the summer of 1988.

VMBackup product manager Janet Gobeille shrugged off the newcomers and said VM Software's six years in the business and its marketing agreement with IBM give it a clear advantage. "The fact that IBM markets our product should make it really tough for them," Gobeille said.

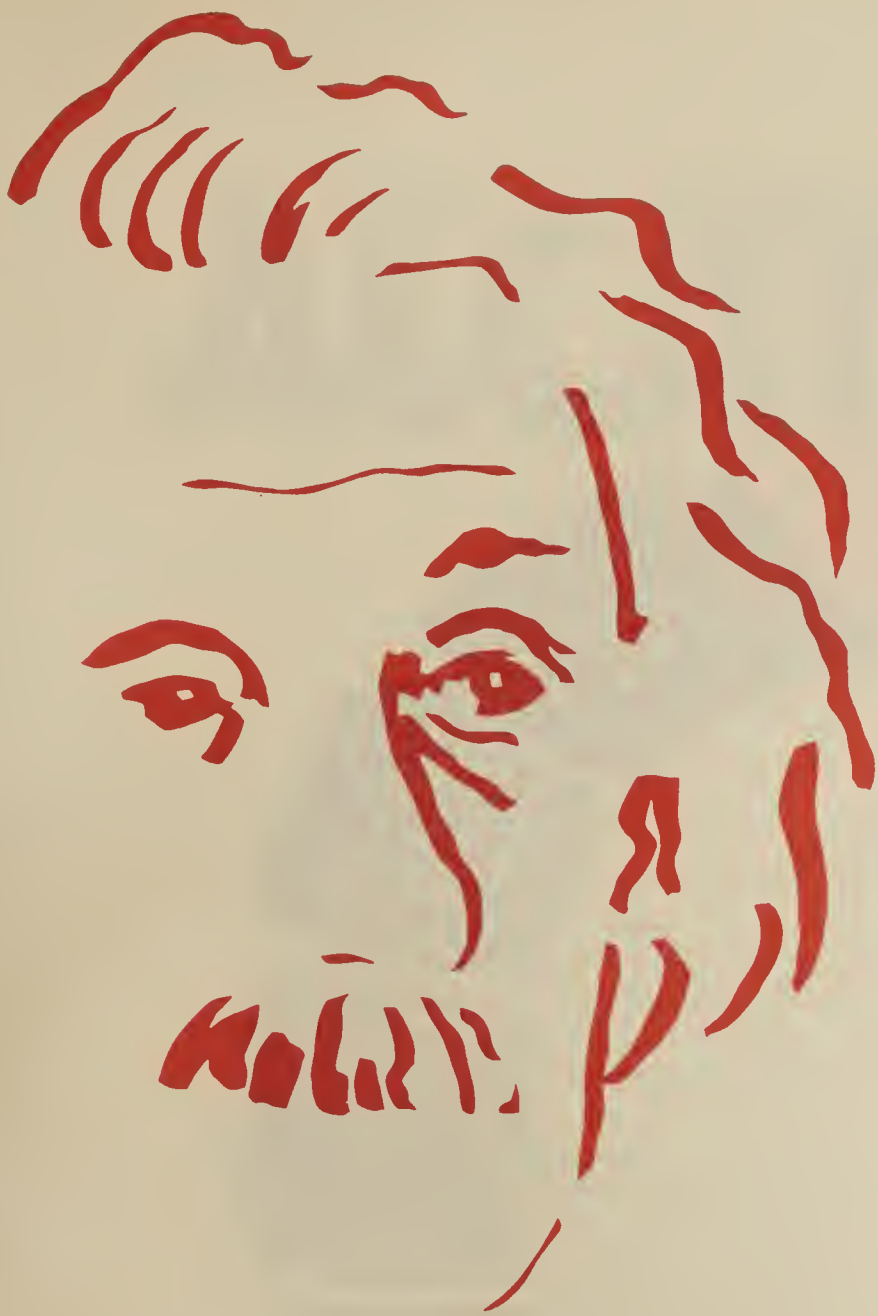
She also said that while the batch-orientation of the current version is not the latest technology, it is not a hindrance either, since backups are typically done in batch mode. What the current version does not have is the ability to modify the program interactively, a feature that will be provided next year, she said.

But Sterling noted that its DMS/VM, an on-line, interactive system, is available now.

Diversified Data will be offering its product for \$4,995 for any size CPU. VMBackup, which uses a graduated pricing structure, starts at \$11,000.

Sterling's DMS/VM is made up of three components, which are not offered separately. The combined package can be licensed for between \$10,000 and \$15,000, depending on the CPU size. DMS/VM-Backup provides VM/CMS minidisk and file backup. DMS/VM-Archive allows users to store infrequently used files in a designated archive area. DMS/VM-Tape manages tape drive use.

VM/Quarterback from Diversified Data is also an on-line system with menu displays. It has a query subsystem used to locate a file and restore that file with one command.



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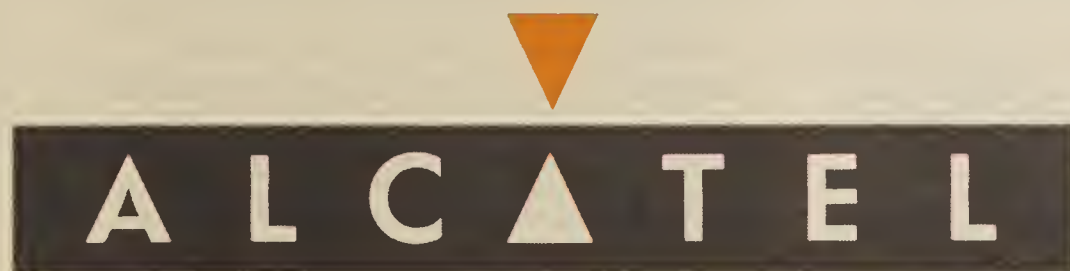
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Data Language enhances Progress

Language runs on DEC's VMS, offers overlapping windows

BILLERICA, Mass. — Data Language Corp. recently enhanced Progress, its fourth-generation language and relational data base management system, and announced its availability on Digital Equipment Corp.'s VMS operating system.

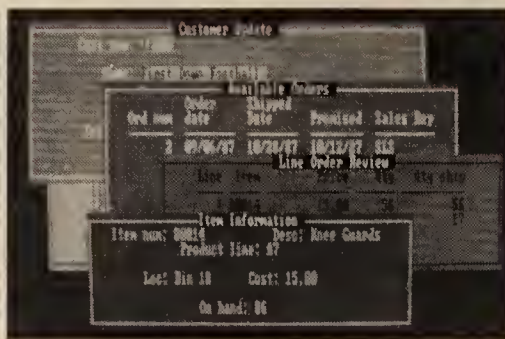
A company spokesman said more than 10,000 licenses have been sold since Progress was introduced in 1984.

It is used by both resellers and end users for developing independent applications such as distribution systems and manufacturing resource planning systems.

Ross Hunter of Ventana Systems, Inc. uses Progress to build DBMSs for Fortune 500-type companies. "Progress provides key-stroke control, which allows immediate feedback from the user. That's valuable," Hunter said.

The product consists of five integrated components: a relational data base manager; a data dictionary; an application language; an automatic screen and report formatter; and a full-screen procedure editor.

Version 4 features such enhancements as a personal computer-like ability to



Progress's overlapping windows.

overlap windows in color, a roll forward recovery function for protection against system crashes, support for C subroutines and support for such security features as password protection on all operating systems.

According to Hunter, the most useful

new feature is the overlapping windows. "Also, Version 4 provides complete control over color, so each window can have a different background color," he said.

In addition to DEC's VMS, Progress runs on Unix, DEC's Ultrix, Microsoft Corp.'s Xenix and MS-DOS and local-area networks. Version 4 is said to be transparently portable across these computing environments.

Hunter said that with Progress, he wrote a prototype of an airline reservation system for the DEC Vaxmate under MS-DOS and then ported it to run on a VAX under VMS.

"To me, the ease of portability is just unheard-of," he said.

Pricing for a full application development copy of Progress Version 4 costs from \$1,000 to \$125,000, according to the company.

Version 4 is slated to ship this month, the vendor said.

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Data Access revises its DBMS version

MIAMI — Data Access Corp. recently released a revised version of its relational data base management and development system that runs on a number of minicomputers, including Digital Equipment Corp.'s VAX and IBM's Personal Computer.

Dataflex 2.3 was rewritten in the C programming language, and a number of new commands have been added.

In addition, the company said it will provide its C source code, which includes a library of about 100 C functions, to software developers beginning in January. Release 2.3 supports floating-point arithmetic, the company said. It can detect and use an Intel Corp. 8087 or 80287 math coprocessor that is present in the system, officials said.

Allows graphics design

The new commands are intended for graphics design, enabling users to write programs that will create pie charts, bar graphs and other graphics.

Dataflex was first introduced as a personal computer data base management and development environment. The company ported it to the VAX and AT&T's Unix System V environments this year.

It uses a proprietary fourth-generation programming language for program development and provides a code generator for programs and reports, the vendor said.

The data base management component uses an image-oriented screen format, according to company officials.

The single-user personal computer license is priced at \$695, while the PC local-area network version costs \$1,250 for an unlimited number of workstations. Licenses for the VAX and Unix versions range in price from \$1,800 to \$9,000, depending on the number of users supported.

The Unix version runs on AT&T's 3B minicomputers and 6300 series as well as hardware from NCR Corp., Unisys Corp., Plexus Computers, Inc. and Convergent Technologies, Inc.

Nomad family receives SNA, LU6.2 support

BY ALAN ALPER
CW STAFF

NEW ORLEANS — Users of the Nomad family of relational data base management and applications development products can look forward to increased Systems Network Architecture support, including adoption of LU6.2, IBM's peer-to-peer communications protocol, in new mainframe and personal computer versions of Nomad under development for release in early 1989.

At the recent Nomad users conference here, Must Software International, the Thomson SA subsidiary that acquired Nomad from D&B Computing Services last summer, detailed performance and ease-of-use enhancements slated for the next releases of Nomad 2.

Those releases — the mainframe version and PC Nomad — are scheduled for February.

During the conference, Must disclosed that referential integrity and resource tracking would be supported on both Nomad 2 V.5.0 and PC Nomad V.2.0.

In addition, the company said a Nomad version for Digital Equipment Corp. VAX computers would be introduced before midyear [CW, Oct. 26].

Company executives also sketched out enhancements under development for

Nomad 2 V.5.0 and PC Nomad 3.0, including the adoption of Views; availability of interfaces to other SQL-based DBMSs such as Oracle Corp.'s Oracle; and support for local-area network (LAN) servers. LU6.2 support, noted Must's Vice-President of Planning Ray Ingram, is among the more crucial enhancements planned for the new versions.

'Increase flexibility'

"We have peer-to-peer communications between Nomads, but LU6.2 will increase the product's flexibility; it's absolutely something we have to have," Ingram said.

Views, in an SQL sense, means reading and writing to multiple files and files types, Ingram explained. Support of Views, for example, will enable a Nomad user to define both a Nomad and an IBM DB2 file and write to or generate a report from both, Ingram said.

While interfaces to IBM's SQL/DS and DB2 are already available with the current versions of Nomad, Must is reportedly developing a link to a number of SQL-based DBMSs, including Oracle. "Oracle is first because it is the one our customers are clamoring for," Ingram said.

The support for multiple users of Nomad on a LAN is something Must devel-

opers said is a high priority for the next full release of both products. "We're also looking at doing a LAN gateway for dedicated data base machines or mainframes running DB2," Ingram said.

Many of the planned enhancements are already under development, Ingram said. The firm expects to ship both new versions of PC Nomad and Nomad 2 to beta-test sites in the third quarter of 1988. "That will assure they will be ready for shipment early in 1989," Ingram said.

Nomad users were pleased to hear about the enhancements. "It's nice that [Must] has long-term goals and the means to reach those goals," noted Lloyd Erickson, president of the Nomad users group Oasis and an engineer at the National Aeronautics and Space Administration.

Powerhouse gets screen painter

PEABODY, Mass. — Cognos Corp. last month said it will add a screen painter utility to Powerhouse, its fourth-generation development language, early next year.

Powerhouse runs on Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. hardware. The screen painter would allow users to create advanced screen design with function keys and cursor control or by entering commands. Cognos said the screen painter program will be integrated in the Powerhouse environment. A user can key in a Paint command, which automatically constructs a basic screen and puts the user in the screen painter subsystem. From that point, a user can edit the basic screen format.

Cognos will initially offer the screen painter option for VAX users. It will then provide it for the HP, DG and IBM Personal Computer AT platforms at a later date, although it would not specify when.

In September, the company announced it was beta testing an AT version of Powerhouse, which it said will be available in the first quarter of next year.

According to Cognos, Powerhouse is installed at approximately 8,000 sites. The system works with the file-management systems provided by the hardware vendors. Earlier this year, Cognos announced that Powerhouse would also work with DEC's relational data base management system, Rdb.

The screen painter option will be offered at no extra charge, Cognos said. Licenses for Powerhouse range from \$5,000 for a DEC Microvax 2000-class system to \$180,000 for high-end systems such as the VAX 8978, a cluster of eight VAX 8700s.



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Expertise

FROM PAGE 23

offer advice on the development of Knowledgetool and found the product notable because it incorporates a number of advanced features.

The software is strikingly different from IBM's initial expert system shell, Expert System Environment (ESE), which was recently elevated from program offering to program product status (see chart at right). A key difference is that ESE has many ease-of-use features designed for users with little or no programming experience, while Knowledgetool lacks these features.

On the other hand, Knowledgetool provides a powerful knowledge base syntax and rule-processing algorithm for use by programmers and technical experts. Also, Knowledgetool is supported in CICS and IMS, and ESE is not, although IBM has included this support in its statement of direction for ESE.

Advantages

Knowledgetool provides 370 programmers with an expert system similar to OPS5, the forward-chaining — or "data-driven" — expert system language developed at Carnegie-Mellon University. But Knowledgetool offers significantly extended capabilities. Its major features include the following:

- Clarity of rule-based code. OPS5's syntax is unlike that used in standard procedural languages and is difficult to under-

stand without extensive comments. Knowledgetool uses a syntax that is an extension of PL/I and should be easily understood by most programmers. On the other hand, nonprogrammers will probably find the syntax hard to follow.

- Improved inferencing control and knowledge representation. Unlike OPS5, Knowledgetool's conflict-resolution cycle is separate from the working memory-update function. Knowledgetool also allows the user to specify priorities for resolving rules rather than relying solely on random rule selection or "last resort" conflict resolution.

Without these features, the user often must separate single pieces of knowledge into a number of different rules and modules in order to force the inference engine to halt appropriately or to consider certain conclusions. Thus, Knowledgetool facilitates a relatively compact, comprehensible and natural encoding of knowledge.

- High-speed operation. Knowledgetool compiles the rules into a rule list. The rule-list technology is based on the RETE algorithm, which is the rule representation and prioritization algorithm first introduced in OPS5. Knowledgetool code is preprocessed by the Knowledgetool processor and is then compiled by the PL/I compiler. This permits extremely fast inferencing at run time, making Knowl-

Night and day

IBM describes its two expert systems tools, which are markedly different, as complementary

Product name	Inference method	Development environment	Runtime code	Compatibility	Price
Knowledgetool	Forward chaining, data driven	No	Compiled PL/I	IBM's VM/SP, MVS/XA, CICS 1.7, IMS, DB2	\$950 monthly license charge
Expert Systems Environment	Backward chaining	Yes	Interpreted Pascal	IBM's MVS/TSO, VM	\$42,500 one-time fee

CW CHART

edgetool suitable for large-scale or time-critical processes.

- Integration with applications and facilities in MVS/XA and VM/SP. Knowledgetool offers direct access to communications facilities and timers as well as specific support in CICS 1.7, IMS and DB2.

Disadvantages

There are also drawbacks to Knowledgetool, some of which were inherited from OPS5:

- Lack of a development environment. Most expert system shells provide a user-friendly environment for developing the knowledge base. Many shells were designed to help nonprogrammers specify data and enter knowledge. These shells can also check for errors during editing.

Knowledgetool, like OPS5, provides no such ease-of-use features. Instead, a standard editor such as ISPF or XEdit must be used to create a Knowledgetool knowledge base. Furthermore, the syntax for Knowledgetool is very much like PL/I. Conse-

quently, nonprogrammers will find Knowledgetool difficult to use and may even have problems comprehending a Knowledgetool knowledge base.

- Lack of rapid prototyping facilities. Knowledgetool must be run as a compiled program. There is no Knowledgetool interpreter or other specific support for rapid prototyping.

- Lack of backward chaining. Many of the popular expert system shells, including ESE, can both forward- and backward-chain. Backward chainers can automatically generate queries to the user for information. By contrast, Knowledgetool is strictly a forward chainer and must acquire all data for a given module of knowledge before initiating that module. And it will not automatically generate any user queries if additional data is required within a module.

This is not a problem in terms of the reasoning capability of Knowledgetool, but it does make Knowledgetool considerably less user friendly than typical back-

ward chainers.

Knowledgetool derives from research on YES/MVS at IBM's Thomas J. Watson Research Center. YES/MVS is an experimental expert system that assists operators running the MVS operating system.

The aim was to develop an expert system that could take messages from the console and apply knowledge about MVS to deter-

mine what action should be taken. YES/MVS needed to be fast enough to keep up with the console and had to be able to initiate actions without operator intervention.

IBM developed YES/MVS 1 using a LISP-based version of OPS5 running on a 370 under VM. In the course of writing YES/MVS 1, the IBM research team found that some additional language features would be useful. This led the team to develop an experimental expert system language, YES/L1. YES/L1 provided direct real-time and communications support under VM, and it incorporated some advanced knowledge representation and inferencing capabilities not found in OPS5.

The basic technology developed in the course of writing YES/L1 was used to write Knowledgetool.

The components

Knowledgetool has three basic components: the working memory, the rule memory and the in-

And then there were four: Knowledgetool vs. competitors

BY CHARLES BABCOCK
CW STAFF

IBM's offering of Knowledgetool marks a broadening of the market for expert system, or rules-based, programs.

While it shares many characteristics with its handful of competitors, it is an expert system building tool almost exclusively for traditional programmers and was designed to fit into traditional mainframe transaction processing environments.

This has its advantages and disadvantages. Knowledgetool, slated to become available Dec. 18, will be almost useless to a knowledge engineer, skilled at extracting human expertise and formulating it into a series of rules, unless he is also an experienced PL/I programmer. On the other hand, if a PL/I programmer learns the knowledge engineering process, he will be able to formulate rules written in PL/I and process them with a PL/I language inference engine.

"This is specifically designed to enhance the productivity of PL/I programmers," says Bohdan O. Szuprowicz, senior consultant with the national expert

system service of the Computer Task Group, Inc.

PL/I is the IBM-originated language at one time envisioned as a replacement for Cobol. It fits into the same third-generation category as Cobol and never caught on to the extent IBM hoped. Industry observers say there are few data processing centers that rely on it exclusively; it is almost always found in shops that use it along with Cobol and other languages.

Nevertheless, much can be accomplished with PL/I in the hands of a skilled programmer. Since IBM has more than its share of PL/I programmers, it is not surprising that IBM turned to it for an expert system tool for the mainframe environment.

"IBM is fostering the notion that an expert system isn't a thing, that there are different ways to attack it. IBM has got a nicely segmented approach," says Esther Dyson, editor and publisher of "Release 1.0," a New York-based newsletter.

Knowledgetool is different from IBM's Expert System Environment (ESE), announced in mid-1986, and its two competitors in the mainframe trans-

action processing world, Application Expert from Cullinet Software, Inc. and Aion Development System (ADS) from Aion Corp., the 3-year-old Palo Alto, Calif., firm.

ESE falls under the heading of an end user-oriented expert system building shell: A knowledge engineer formulates English-style rules and definitions and applies them within the options presented by the shell. ESE offers 120 different preset commands for formulating the expert system rather than relying on the user's programming skills and offers both forward and backward chaining through its inference engine, Szuprowicz says.

Knowledgetool, on the other hand, lets the programmer write his own PL/I commands on how the expertise of the system should be invoked. Its inference engine is limited to the forward-chaining method.

"We think backward chaining is more appropriate for the type of application that Application Expert and Knowledgetool are geared to," says Cullinet Executive Vice-President of Application Products John B. Landry, who directed the Application Expert development effort

at Distribution Management Systems, Inc. before that firm was acquired by Cullinet. Application Expert is both forward and backward chaining.

Harry C. Reinstein, president of Aion, said his firm's ADS is also both forward and backward chaining.

ADS and Application Expert both formulate rules in a language that offers English-like syntax.

Application Expert is written in Cobol and can be embedded in existing mainframe Cobol applications, much as Knowledgetool can be embedded in an existing Cobol or PL/I application. IBM spokesmen say it will also function with Fortran, Pascal and assembler applications.

ADS can be used to embed rules-based expertise in an existing IBM CICS application and then call an inference engine in its own CICS region via the LU6.2 communications protocol, which allows it to run as a VTAM application.

PL/I was not included on the list of languages covered by Systems Application Architecture, IBM spokesmen acknowledge. They left the door open to expanding the list to include PL/I at some unspecified point in the future.

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ference engine. The working memory is the temporary storage area for all data or working memory elements that are active. The rule memory stores the active rules or "productions," as they are referred to in Knowledgetool and OPS5. The Knowledgetool inference engine, which fires the rules, has multiple phases similar to OPS5's.

Knowledgetool supports the same data types as PL/I. In addition, working memory is subdivided into classes, each of which possesses certain properties. The user or the application then uses selectors to designate a particular instance of a class member. For example, "my portfolio = portfolio" means that "my portfolio" selects a specific member of the class "portfolio" in working memory.

Classes in Knowledgetool can be either global or local to a module. They are useful structures for organizing facts, avoiding naming conflicts and creating a simple

KNOWLEDGETOOL provides 370 programmers with an expert system similar to OPS5.

modular structure for a knowledge base.

Just as in OPS5, rules in Knowledgetool are divided into a left-hand side (LHS), or premise, and a right-hand side (RHS), or conclusion.

Rules and inferencing

The inference engine first recognizes all rules in the rule memory that have the LHS satisfied by the working memory. If the LHS of more than one rule is satisfied, these rules are placed in the conflict set and the inference engine enters the conflict-resolution phase.

The first form of conflict resolution is to discard all rules that have already fired. Then the rule with the highest priority is selected. Priorities can be assigned by the programmer when a rule is created, but priority assignment is optional.

If preset priorities cannot resolve the conflict, the system chooses the most recent rule in the conflict set after the working memory is updated. If this does not work, the rule with the most conditions on the LHS will be selected. Finally, if these means are not sufficient, a random selection among tied rules is made. The selected rule is then fired.

The execution of the rule may create, update or remove class members. This changes the conflict set. The conflict set can also be changed by using a REFRESH statement that will tell the inference engine to act as if the class member has changed.

As long as rules remain in the conflict set, the cycle of "recognize, conflict-resolution, act" is repeated. Otherwise, the inference engine stops. The programmer can also stop the cycle with a RETURN or QUIT statement in the RHS.

Problem solver?

After getting their feet wet with expert systems, many MIS organizations are finding that certain applications require integration with existing CICS or IMS systems and software. Performance has also been a major concern. At the sacrifice of some user-friendliness, Knowledgetool is a potential solution for these problems.

Knowledgetool is also significant because it brings a powerful inferencing technology, derived from OPS5, to the world of data processing. Digital Equipment Corp. used OPS5 to build XCON, the expert system for configuring the VAX that is also called R1. XCON is one of the best known and most complex expert system applications, and it has proven the power of the OPS5 inference engine.

With Knowledgetool, IBM has offered a very powerful expert system technology for data processing environments.

Schwartz is president of Computer Research Associates, Inc., a software development and consulting firm in Atlanta. He is currently developing expert systems for clients in the banking and financial service industries.

On-line adviser

CONTINUED FROM PAGE 23

services software and claims the new system will help agents decide how to reposition an individual's assets. Repositioning has to include tax considerations, insurance needs, the amount of risk willing to be entertained in investments and other factors, according to Gaynor.

New York Life is offering the service to its clients free of charge, informing customers that a computerized expert system is helping the agents evaluate their position. Part of the purpose of the test is to ascertain whether customers would be willing to pay for a service based on the expert system, he says.

Working with the system, the agent, with the help of the client, fills out a questionnaire on an IBM PC, which is uploaded to a Microvax for evaluation. The Microvax produces a client profile, which is fed to a high-speed laser printer. The report typically consists of 15 to 20 pages of recommendations for the client, plus a four to six page report for the field agent.

Applied Expert Systems developed the client profiling system in partnership with John Hancock, where Daniel L. Ouellette, general director of marketing systems, says early customer response to the expert system has been favorable.

The 4-year-old Cambridge firm sells the client profiling system at a base price of \$150,000 along with consulting services to tailor it to specific institutions.



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*Results produced without transaction protected files.

¹ Based on standardized ETI Benchmark. Results published by FT Systems Newsletter, 1987 ITOM Inter. Co. ² Audited results published 10/12/87. ³ Using NonStop SQL[™]. ⁴ Prices for systems: Sequoia \$929,000, Tandem \$995,000, Stratus \$830,000.

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SEQUOIA

Developing

CONTINUED FROM PAGE 23

ering its cost. It does this by teaching him about the system development life cycle process, the roles of the people involved and the ways they can reduce costs in all areas.

This orientation should begin prior to the requirements phase. The more the users know about the system development life cycle and the cost of identifying and correcting mistakes, the more they will try to help you.

Who, what, where, why, how

The orientation begins by identifying the various MIS entities and their functions. These will often include data base administration, data administration, production control, quality assurance, systems, operations, development center, information center and programming staff. Show how these functions work together behind the scenes to develop the system.

The users may never see these people working, but they hear about them in meetings, read about them in reports and pay their salaries. The more they know about the other "players" in the game, the more comfortable they'll feel playing.

In addition, a computer facilities tour can give the user a better understanding of the hardware and storage space involved in data processing.

A glance in a tape library and a discussion about contingency plans helps the user understand the importance of backups.

A glimpse of the storage room and a discussion of the cost of paper and the amount of paper used over a period of time will help the user understand the cost of unnecessary reports and the possible savings that can be achieved by on-line systems.

A presentation about the cost of software correction is a real eye-opener for the users. It gives them the chance to see how their money is spent and how they can lower their cost.

Emphasize the cost benefits of early error detection and their role in this process. Your quality assurance analyst, production control and accounting functions can also provide system development, maintenance,abend and rerun cost data.

Zeroing in on savings

It's important to show the users that "one more little change" can cost more than a thousand dollars in people and machine time.

This can be done by showing how much time is spent making a production change, identifying all of the people involved — for example, programmers, management approvers, data base administrators, quality assurance, production control personnel and documentation librarian — and the computer cost to make the change and then rerun all the jobs.

This might make them think twice about requesting unproductive or unreasonable requests.

Explain the importance of standards and structured walk-through concepts.

Stress the importance of reading the document before, not during, the meeting and identifying the errors.

Once again, show that it is cheaper to

THE MORE the users know about the system development life cycle and the cost of identifying and correcting mistakes, the more they will try to help you.

find and correct errors in a requirements walk-through than during the testing phase.

Also, indicate that statistics show that most errors can be traced to the requirements and design phases even though they are identified in the programming and testing phases.

Emphasize that the users' involvement during a walk-through can save them thousands of development and maintenance dollars.

Finally, explain the entire system development life cycle process phase by phase.

Provide the users with a brief definition of each phase and identify its inputs, processes, outputs and participants. Show how one phase's outputs are another's inputs.

Use an example to illustrate how an unidentified mistake during the requirements phase can cause monumental problems during the later phases.

This can be done by identifying the number of documents and other outputs that might be created or updated as a result of an error. In addition, identify ways that the user can save money during each of the phases by his level of participation.

Prepare a system development life cycle reference guide for the user. This guide should contain structured walk-through guidelines, an overview of the system development life cycle and their roles in each phase, a list of acronyms, a glossary and an overview of the data processing department.

Reed is a quality assurance consultant with the data services department of the Federal Reserve Bank of Dallas.



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NEW PRODUCTS

Systems software

Interactive Development Environments, Inc. has ported its **Software Through Pictures** computer-aided software engineering (CASE) product to Hewlett-Packard Co. HP 9000 series workstations running under the HP-UX operating system.

Software through Pictures is made up of a set of integrated CASE products that provides graphical tools for analyzing, designing and prototyping stages of the software development cycle. The software's graphics editors are used to develop data-flow diagrams, state-transition diagrams and structure charts to define data elements and to create entity relationship models. A data dictionary supports the definition of names, types, constants and associated text.

Software Through Pictures for the HP 9000 costs \$17,000.

Interactive Development Environments, Suite 210, 150 Fourth St., San Francisco, Calif. 94103. 415-543-0900.

Jobtrax/MVS, a data center problem management system designed to automatically track outages and maintain a historical data base, has been announced by **American Software, Inc.**

The software is said to route outages to designated personnel for problem resolution through the use of IBM TSO/ISPF panels. Features include a data collection facility and a data base management system that includes reporting and manual problem entry.

Other features include automatic problem collection, automatic user notification, a user reroute facility, an on-line application profile, security levels, data base query and access through ISPF menus and batch utilities.

Jobtrax/MVS costs \$10,000 for the first CPU and \$6,500 for each additional CPU.

American Software, 79 Avondale Lane, Aberdeen, N.J. 07747. 201-566-4081.

Applications packages

An IBM VTAM-based application said to allow IBM 3270 terminal users to access public and private data networks from a full-screen menu has been announced by **Duquesne Systems, Inc.**

STX Release 1.1 allows users of 3270 terminals to access information previously accessible only through a Digital Equipment Corp. VT100 terminal, the vendor said. Users can also emulate other terminals, including IBM's 3101 and Hewlett-Packard Co. and Tandem Computer Systems, Inc. terminals, to connect services such as resident electronic-mail packages, financial services and chemical abstract listings.

STX is priced from \$25,000 to \$35,000.

Duquesne, Two Allegheny Center, Pittsburgh, Pa. 15212. 412-323-2600.

An enhanced version of the **Dynaword** IBM mainframe-based word processing component of the Dynasoft Integrated Software System has been announced by **Dynasoft Corp.**

Dynaword now supports the Revisable Form Text of the IBM Document Content

Architecture (DCA) storage format and includes a full-featured 80,000-word spell-checker and a thesaurus.

Dynaword Version 1.1 documents stored in DCA format can be transmitted to various DCA storage devices and among other system libraries.

Dynaword Version 1.1 costs \$6,000 to \$19,000, depending on CPU size.

Dynasoft, 6300 River Road, Rosemont, Ill. 60018. 312-696-4440.

Utilities

An IBM VTAM session manager said to allow users to switch between VTAM ap-

plications by pressing a key has been announced by **MacKinney Systems.**

VTAM/Switch also allows multiple sessions in the same application, the vendor said. It operates as a standard VTAM application and allows for security. It costs \$1,495 for DOS and \$2,999 for MVS.

MacKinney also announced **ISPF/V-SAM Utility**, an on-line tool which, through IBM's ISPF, allows access to frequently used VSAM functions normally done with batch processing. It costs \$895.

Annual leases are available for both products.

MacKinney, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804. 417-882-8012.

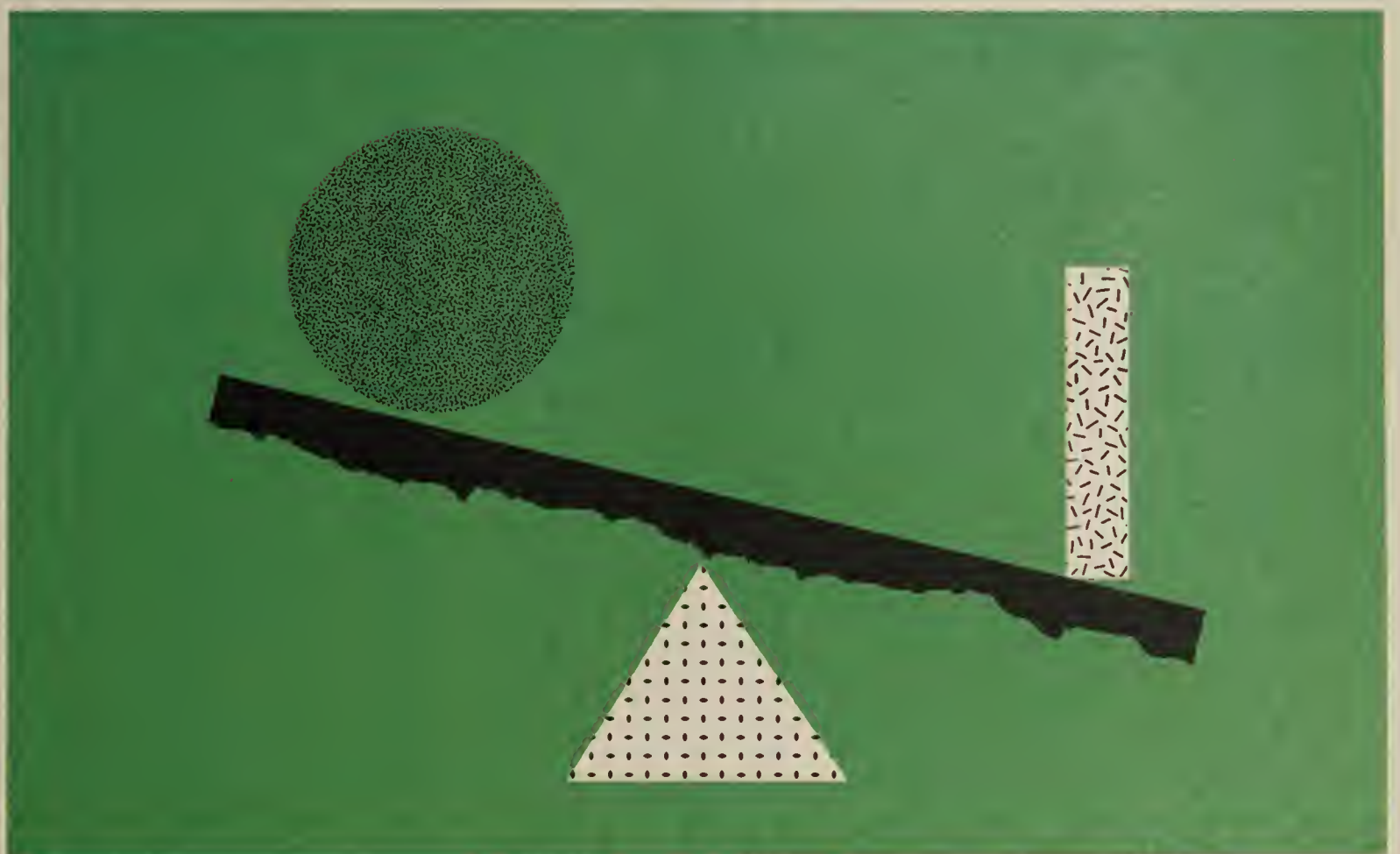
Development tools

An implementation of the **NAG Fortran Library** for the IBM 3090 Vector Facility has been announced by the **Numerical Algorithms Group, Inc.**

According to the vendor, 470 of the 688 user-level mathematical and statistical routines in Mark 12 of the NAG Fortran Library utilize vectorized code on the 3090 Vector Facility. Features include fast Fourier transform.

The NAG Fortran Library for an IBM 3090 with the Vector Facility is priced at \$2,275 for an annual lease.

Numerical Algorithms, Suite 100, 1101 31st St., Downers Grove, Ill. 60515. 312-971-2337.



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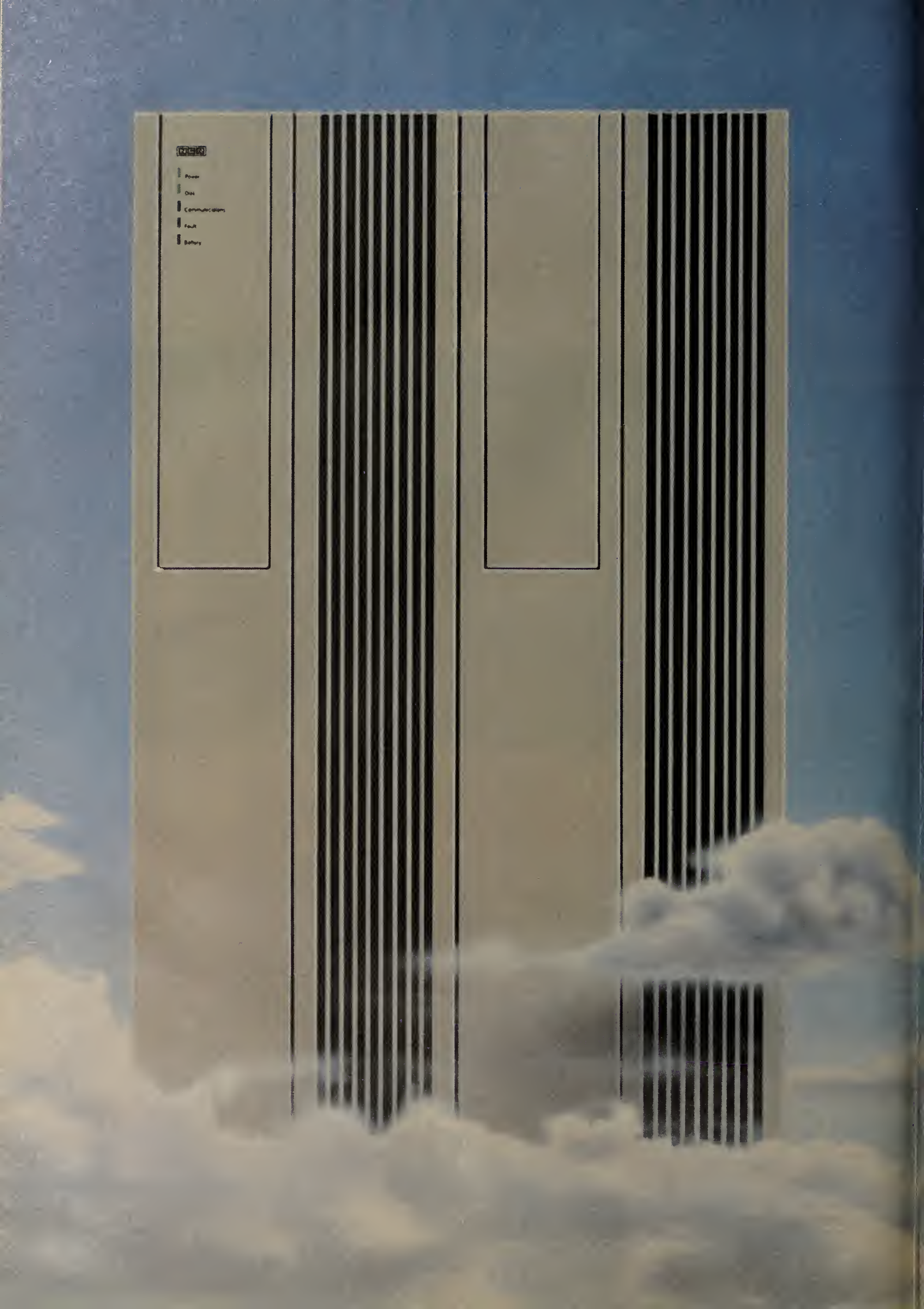
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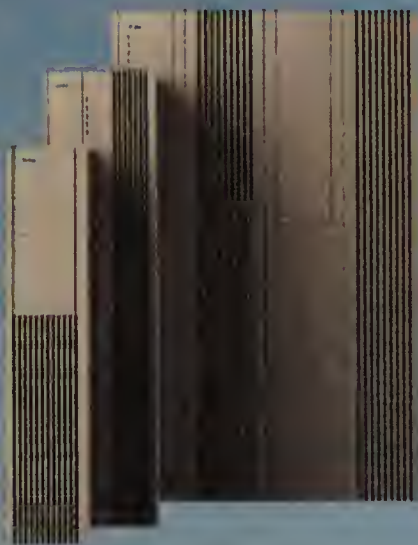
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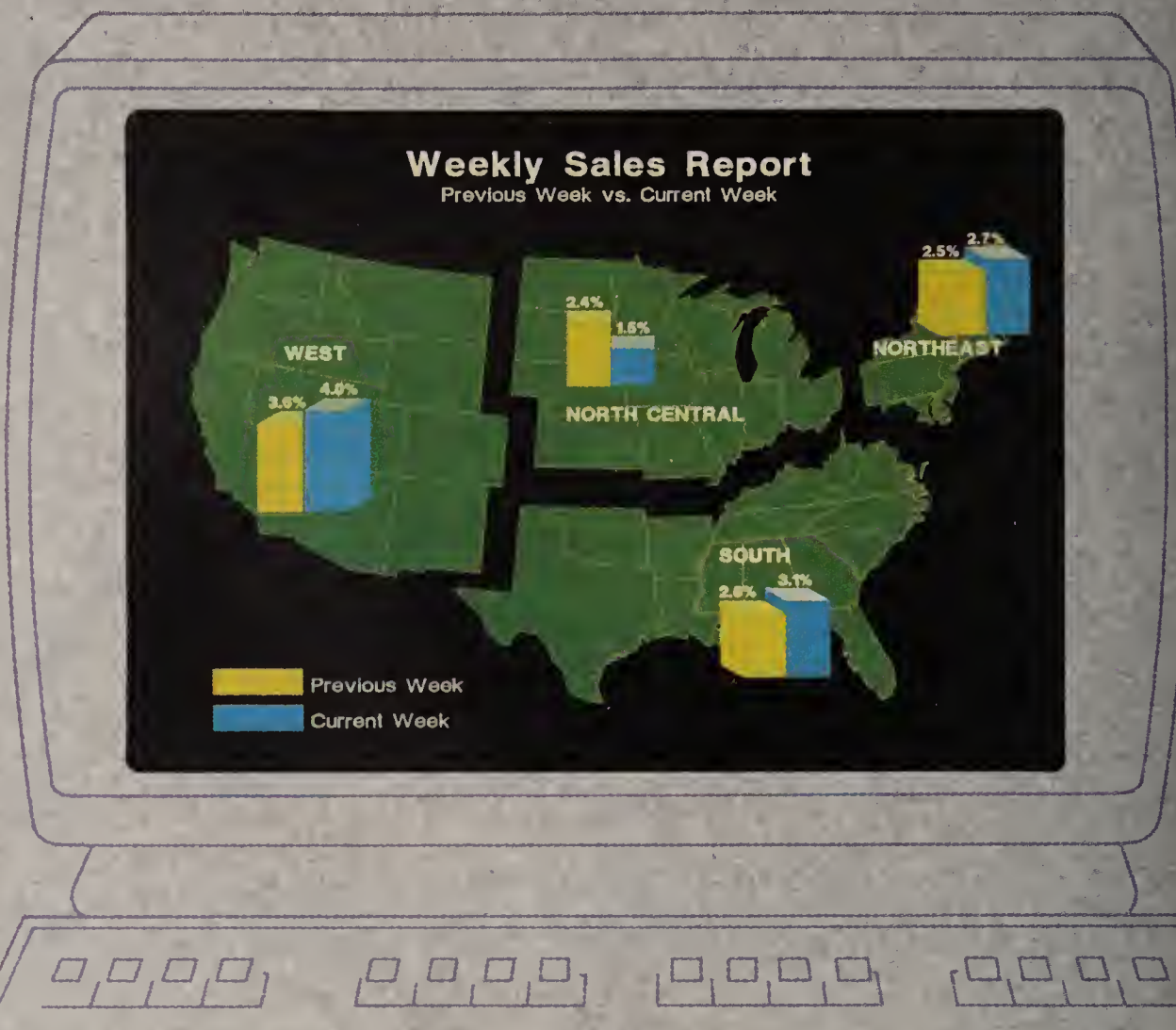
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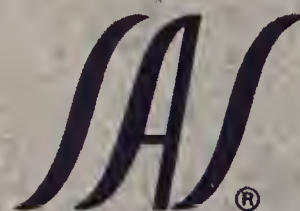
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M I C R O B I T S

Ed Scannell

Killing PC bugs



Break out the Black Flag. Microsoft is apparently having a bit of trouble exterminating the last few

bugs in the PC version of Excel. At the product's introduction last month, Microsoft promised delivery by the end of October. Now, an early to mid-November ship date looks more likely, according to one source.

The folks at Microsoft are probably applying some pesticide to Windows 2.0 as well. The company promised to deliver the operating environment by the end of September. Some rumorologists think it makes sense for Microsoft to release Excel and Windows at the same time. We'll see.

One scuzzy motherboard. One source told us last week that IBM is thinking of incorporating a small computer systems interface (SCSI) motherboard into its Personal System/2 Models 60 and higher. An SCSI product would pull the cork on the 8-bit bottleneck by allowing the PS/2s to communicate with peripherals that can take advantage of the Micro Channel's 32-bit data paths. Our source

Continued on page 50

Informix stakes out OS/2 turf

Says tools offer relational DBMS developers application lead time

BY STEPHEN JONES
CW STAFF

MENLO PARK, Calif. — Claiming to be the first to offer advanced data base software for Microsoft Corp. and IBM's OS/2, Informix Software, Inc. last week announced prerelease OS/2 versions of its software and development tools.

The products — the \$1,500 Informix-4GL, the \$995 Informix-SQL and the \$749 Informix-ESQL/C — are aimed at allowing developers to work on applications prior to the shipment of OS/2, slated for later this year. These products will be available to the first 500 qualified OS/2 developers free of

charge, Informix officials said.

Informix also recently announced two fourth-generation language products designed to reduce the development time of data base applications.

The Rapid Development System, which starts at \$1,800, reportedly eliminates the need for a C language-compatible linker and compiler.

The programming language cuts development time by compiling language code into a proprietary pseudocode and bypasses the need to compile and link a language into an executable program, a company representative said. The product also reportedly supports a number of features, including windows, color and

multiple-page menus.

Informix also announced Interactive Debugger, which works interactively within a running program. The \$1,200 package features a source code window and a command window for setting break points and printing variables.

Both products are available on Unix, with MS-DOS and Digital Equipment Corp. VMS versions scheduled for shipment early next year.

Informix also released its financial results for the third quarter ended Sept. 26. Revenue rose 100% from the year-earlier period to \$11.4 million; net income jumped 163% to \$1.9 million, or 20 cents per share.

Unisys PCs powered by Intel

BY JAMES A. MARTIN
CW STAFF

LAS VEGAS — Unisys Corp. introduced three microcomputers based on Intel Corp.'s 80286 and 80386 microprocessors last week that were designed to support Microsoft Corp.'s MS-DOS, Xenix System V, Windows 2.0 and MS OS/2 operating systems. In addition, Unisys announced support on its Usernet local-area network for IBM's Token-Ring Network.

The Personal Workstation 2 family is targeted mostly at Unisys's installed base and is expected to gradually replace the existing PC HT and PC IT, which were sold originally by Sperry Corp. before it merged with Burroughs Corp.

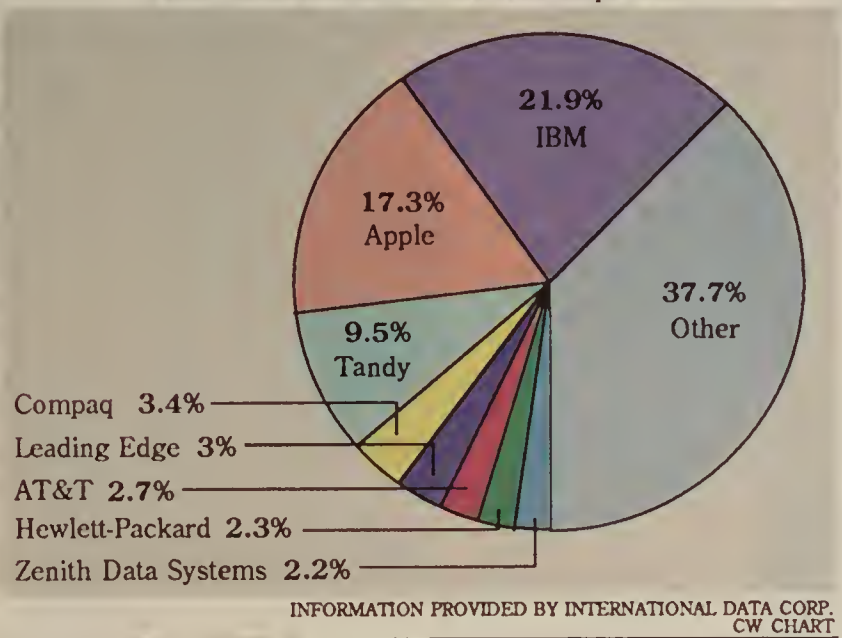
MS OS/2 will reportedly be supported on the entire line, while Windows 2.0 will be supported on the Series 300 and

Continued on page 54

Data View

PC U.S. market

Vendor shares in dollars and unit shipments



Alis OA tool targets 386

BY DOUGLAS BARNEY
CW STAFF

BOSTON — Applix, Inc. unveiled last week a full 32-bit implementation of its Alis integrated office-automation software aimed at Intel Corp. 80386-based microcomputers.

The product, which runs under Santa Cruz Operation's Xenix 386 operating system, is aimed largely at sophisticated single-user operations. In addition to taking advantage of large

Continued on page 54

Inside

- Star Gate offers serial card that adds eight ports to PS/2 line. Page 44.
- Cullinet reaffirms commitment to providing micro software. Page 49.
- NEC Home Electronics announces hard-disk version of Multispeed laptop. Page 55.

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S M A L L
T A L K

William Zachmann

The Word 4.0
is out

Microsoft Corp.'s Word and I go back a long way. We've hung out with the same crowd and have even

gone out on a few dates. Somehow, though, we never really hit it off.

The lethargic pace with which Word did things just didn't turn me on. Looking at all those white dots pretending to be letters on an IBM Color Graphics Adapter (CGA) screen was no fun either. What's more, Word seemed awfully confusing and downright counter-intuitive at times. I never remembered which mouse button to push, let alone all the keyboard choices.

Still, I've got to admit there was some kind of attraction there. I had an inescapable feeling that somewhere, somehow, Word and I were going to really get it on. With each new release, I'd try Word again, thinking, "Maybe now is the time." But each time, it wasn't.

Then Word 4.0 came along. Somehow I knew this was make-or-break time.

My last two weeks with Word 4.0 may have been the start of a long relationship. Word is fast now, much faster than I expected. The funny flickers that the cursor on the diamond-shaped end-of-text marker used to make are gone. Word 4.0 jumps around documents with speed comparable to that of the fastest word processors around.

What's more, without making any radical changes to the

Continued on page 49

You get what you pay for: Reseller's song
of support scaling corporate America charts

As chairman of Corporate Software, Inc., Mort Rosenthal is part of a relatively new breed of software resellers that focuses on providing software with enhanced support to America's largest corporations. His firm has proven that many organizations are willing to pay more for software to obtain a high level of support, including handy work-arounds for product bugs.

IN
PERSON

Prior to selling products such as Lotus Development Corp.'s 1-2-3, the string of numbers most familiar to Rosenthal was one, two, ah one, two, three, four. The upbeat Rosenthal was formerly the director of the famous Montreux Jazz Festival in Switzerland. He also sold photos of rock and roll stars.

Rosenthal recently spoke with *Computerworld* Senior Editor Ed Scannell about issues facing information centers and



Rosenthal predicts internal support will face restraints.

MIS and the nightmare of upgrading products.

What is the biggest support challenge facing the information center manager in 1988?

You are going to see a combination of reasons why the support organization will be much more

constrained in terms of resources. There is reasonable evidence that the economy will be a constraint. People will not want to spend a lot of resources on internal support.

Also, OS/2 and everything else related to it causes a lot of incremental burdens for the information center manager. If the

OS/2 compatibility issue is anything close to the compatibility problems of 3½-in. floppy disk drives, we are all in trouble.

Why are upgrades so difficult for corporations to handle?

Because you are talking about thousands of different users geographically spread out. In general, the vendors have not recognized the difficulty of the problem and have not come up with a solution that really addresses the tremendous logistical complexities of upgrading.

How often should vendors upgrade their products?

It is not necessarily a consistent thing across all products. And sometimes there are upgrades that are unnecessary, because a vendor is competing for new users. In other words, they're competing for a user that might

Continued on page 49

Testers laud soon-to-ship Windows/386

BY STEPHEN JONES
CW STAFF

A stand-alone version of Microsoft Corp.'s Windows/386 might not be on the market yet, but the multitasking operating environment already seems to be winning over a cadre of power users who want to exploit the capabilities of Intel Corp. 80386-based microcomputers.

Users who have been beta-testing versions of the \$195 program for the last three months generally gave Windows/386 high marks when contacted by *Computerworld*.

Microsoft said the final version of Windows/386 will begin shipping to retailers next week.

The product currently comes bundled with every Compaq Computer Corp. 80386-based machine.

Should run on all 386s

Users reported that their beta-test copies were compatible only with Compaq hardware, leading some to speculate that the program might have difficulty running on other machines, such as IBM's Personal System/2 Model 80.

But Gabe Newell, Microsoft's program manager for Windows/386, guaranteed that next week's release will be compatible with every 80386-based microcomputer available.

One of the biggest selling

Windows/386

Price: \$195

- A preemptive multitasking graphical operating environment
- Offers expanded memory support
 - Requires MS-DOS, Intel 80386 chip, hard disk drive, IBM Enhanced Graphics Adapter
- 2M bytes of random-access memory suggested

points of Windows/386 is its ability to carry out preemptive multitasking of virtually any Microsoft MS-DOS application. Taking advantage of the 80386

microprocessor's 8086 virtual mode, each application runs like its own virtual machine with a full 640K bytes of memory.

'Great leap forward'

"With Windows/386, the developer doesn't have to worry about cooperating with the other applications and doesn't have to think about setting up the environment for multitasking — it does it on its own," said Anthony Pizi, assistant vice-president of personal computer software development for distributed financial systems at Merrill Lynch & Co. "It's a great leap forward."

Merrill Lynch has successfully used the operating environ-

Continued on page 45

Old Apples far from rotten, hard-core users say

Apple relegates discontinued PCs to the bottom of the barrel, but some still like their flavor

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Although Apple Computer, Inc. would likely prefer its Lisa and Apple III microcomputers fade into obscurity, a cult of stubborn users will not allow these discontinued computers to just go away.

Introduced in the spring of 1981, the Apple III was discontinued in early 1984, shortly after the first Macintosh debuted. The Apple III was positioned as Apple's first business computer.

Apple's Lisa, a second business machine, followed in 1983 and was dropped during the past year.

Apple officials declined to be interviewed regarding the Apple III and Lisa's continued popularity.

Loyal following

Richard Rann, vice-president of the Tau Apple business users group, said the two personal computers have a small but loyal following, despite their drawbacks and the company's attempts to lure their users with

new offerings.

"The Lisa's basic problem was that it was slow," Rann said. "It was powerful. Not until the Mac II came out could you do some of the things you could do on the Lisa."

Apple IIIs suffered from a lack of memory. The first version of that PC offered 96K bytes of random-access memory (RAM); a subsequent version upgraded RAM to 128K bytes, Rann said. Also, the initial units of the Apple III were hampered by quality control problems, requiring Apple to recall some of those units,

he added.

However, that has not dampened the enthusiasm of some users.

Bob Cook, president of Sun Remarketing in Logan, Utah, has created an entire business revolving around selling and supporting Apple's discards.

Cook has purchased 3,500 Apple IIIs and 7,000 Lisas from Apple. Of the Apple IIIs he purchased two years ago, Cook has only 900 left. After only six months on his shelves, he has sold 1,000 Lisas.

Sun Remarketing's customer

base is composed primarily of small businesses that already own Apple IIIs or Lisas, officials said.

"The customers that had one previously want to buy another cheaper," he explained. "The major appeal is price. They can buy a machine that fits their need for a low price."

Sun Remarketing sells a Lisa with a 5M-byte disk drive, 1M byte of RAM and the Mac operating system for \$995. An Apple III complete with monitor sells for \$595.

The Lisa's ability to run 95% of existing Mac applications will make it an even bigger seller for the remarketer than the Apple III was, Cook predicted.

Continued on page 44

Card tacks up to eight ports to PS/2

Star Gate Technologies, Inc. recently introduced a serial card designed to add up to eight serial ports to the IBM Personal System/2 line of personal computers.

The Plus8 MC installs in the 16-bit expansion slot of the PS/2 Models 50, 60 and 80. Accord-

ing to a company spokesman, the card is fully compatible with the PS/2's Micro Channel bus architecture.

"Star Gate does not want to ignore the low-end market, which wants plug-and-play applications to run on the PS/2," said Jim Smith, Star Gate's market-

ing manager. "That's why we designed a dumb serial card for the Micro Channel."

The Plus8 MC supports such Micro Channel features as a programmable option switch, register for software selection of memory addresses, autoconfiguration logic and Micro Chan-

nel-style physical connectors. It also supports several multiuser operating systems, including AT&T's Unix System V, Santa Cruz Operation's SCO Xenix 286 and 386, Pick Systems' Pick, Digital Research, Inc.'s Concurrent DOS and The Software Link, Inc.'s PC/MOS, Multilink Advanced and Lanlink.

Other features include full handshake modem controls over

all eight asynchronous channels.

Star Gate expects the Plus8 MC to be shipping by Nov. 15, Smith said. The eight-port Plus8 MC is priced at \$670. A four-port model that is upgradable to eight ports is also available for \$570.

The Plus8 MC was scheduled to be demonstrated at last week's Comdex/Fall '87 show in Las Vegas.

Old Apples

CONTINUED FROM PAGE 43

Bob Consorti, president of On Three, a third-party developer for the Apple III and Apple IIGS, said Apple III users have shown "a pit bull stubbornness" about their machines. Consorti, who also publishes a newsletter for Apple III users, said "four or five" Fortune 500 companies are among his customers. However, he declined to name them.

"The Apple III people are zealots," Consorti said. "They are stuck like glue to their machines. I'm sure [the machines] will last in certain people's hands for another 10 years."

"Those who've invested \$3,000 to \$4,000 on their machines don't want to give them up because of the resale value," he continued. "It's hard for them to understand that their Apple III is worth only \$100."

John Sauer, owner of Mr. Steak in Fergus Falls, Minn., uses an Apple III in his restaurant. He said he does not anticipate upgrading to another system in the near future.

"I'm just absolutely at home with it," Sauer explained. "Compared to most restaurants, we're advanced. Not many in our business know that the Apple III is obsolete." Sauer uses his Apple III for simple word processing and spreadsheets.

Lois Lloyd, owner of Creative Corner, a retail yarn shop in West Des Moines, Iowa, is also an Apple III enthusiast. Lloyd, who uses her Apple III for bookkeeping, inventory and storing other records, has upgraded her Apple III to 512K bytes of RAM and added a 10M-byte hard disk drive.

"It's a great machine, and it's paid for. I can't get along without it," Lloyd said. "I have good programs, enough memory. I can't see any reason to upgrade."

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Windows/386

FROM PAGE 43

ment as a front end to write generic SQL commands that work with the firm's corporate data base, Pizi said.

Users such as Jack Dreiss, director of development for the accounting and development group at Arthur Andersen & Co. in Chi-

cago, said they like the program's multitasking capabilities for other reasons.

Dreiss said his staff has used Windows/386 for heavy number-crunching applications because the operating environment enables them to switch quickly between various on-screen applications and to view multiple spreadsheets running at the same time. "In the past, we had

been running one application at a time on one machine," he said.

Dreiss also said overlapping windows — instead of the tiled windows seen on the current version of the operating environment — make it easy to cut and paste data in short order.

Although some industry watchers have characterized Windows/386 as a confusing obstacle on the road from MS-DOS

to Microsoft and IBM's OS/2, others have praised the program as a bridge that will give users a transparent migration path to the operating system of tomorrow.

'User's route'

"It's the user's route to OS/2 — we're looking to use it to get to the next operating system plateau," Dreiss said.

Users also praised the reported visual compatibility between Windows/386's graphical user interface and the one that will be available with the upcoming OS/2 Presentation Manager.

Dreiss said that compatibility could save his company money because it would take less time to train employees on a new operating system if they were already accustomed to the program's graphical user interface.

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...not tossed out.



Tapping 386's power now

In the meantime, managers like Pizi said they relish the opportunity to help end users in their companies tap into the power and performance of 80386-based micros by using Windows/386.

"It's a product that enables people to take advantage of 386 capabilities now, which they won't be able to take advantage of under OS/2 for at least two years," said Bill Higgs, an Infocorp analyst. "And for that reason, Windows/386 has a product life of at least two years."

Higgs predicted "very healthy" sales of the product to current owners of 80386-based machines.

Yet Newell conceded that Microsoft views Windows/386 as a transitional product that might ultimately be incorporated into a version of OS/2.

Limitations raise concern

While the initial test copies of Windows/386 seem to be almost free of developmental bugs, users expressed concern that the product can run only one Windows application at a time under the operating environment.

"It's definitely a limitation, but it wouldn't stop me from buying the product," Pizi said.

Newell confirmed that Windows applications are restricted to running in only one virtual machine, but he said a number of Windows applications can operate simultaneously within the same machine.

However, while MS-DOS applications can use up 640K bytes of memory, the Windows applications are limited to 400K bytes each if they share the same virtual machine, he added.

Windows/386 has also had trouble running with Novell, Inc.'s Netware, but Newell said Novell is updating the product to be compatible with the Microsoft operating environment.

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Word 4.0

CONTINUED FROM PAGE 43

program, Microsoft's applications people have made lots of little changes that make Word much less confusing. Don't get me wrong, it's still a far cry from the straightforward simplicity of a Macintosh Write, but it's a lot easier to use than earlier versions of Word.

Word 4.0 is also as powerful as ever, with a number of nice features added. The ability to display things like boldface type, italics, underlining, red-lining and so forth that the use of a graphics display provides has always been a hallmark of Word.

Other key features include a powerful macro facility and a unique "style sheet" approach to creating standard formats. A substantial collection of powerful pre-defined macros is included with Word 4.0.

The style-sheet feature in Word 4.0 lets you create a style as you create a doc-

ument and then save that style for later use in other documents.

Word has always been a product ahead of its time and, therefore, available hardware. A slow Intel Corp. 8088 processor and CGA graphics just didn't do justice to Word's aspirations. With the IBM Enhanced Graphics Adapter's 640-by 350-pixel resolution, however, at least the bottom threshold of workable display graphics is achieved.

The final enticement was using a mouse for cursor control. This is ironic, given that I've been a very slow convert to the thing. It has long seemed annoying to me to have to take my hands off the keyboard.

Now I'd be reluctant to give it up. Using the mouse for positioning the cursor and selecting text is so much superior to using cursor keys and block on/block off commands from the keyboard that I wonder how I ever did without it.

Zachmann is vice-president of research at International Data Corp.

Cullinet opens up its Goldengate

BY DOUGLAS BARNEY
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. recently reaffirmed its commitment to providing microcomputer software to users of its host computers by releasing new versions of its integrated Goldengate package and Infogate, a micro-to-mainframe connectivity application. Cullinet also announced the removal of copy protection from Goldengate.

Goldengate, with a user base of some 20,000, now includes Goldengate:Reporter, a tool for generating reports from Goldengate data files. In addition to its previous word processing component, Goldengate will include a specially modified version of Software Publishing Corp.'s Professional Write.

Professional Write "has been modified so it can accept the data formats within our tools," said Scott Conrad, Cullinet's

senior product manager for end-user products.

The modifications will offer a smoother flow of spreadsheet and data base information into Professional Write documents, Conrad added. Users can now choose between Professional Write and the more sophisticated word processing component that has long been available within Goldengate, the vendor said.

Infogate, with a user base of some 7,000, has been enhanced and is said to provide easier access to live host data. Unlike the previous version, which required that data be converted and downloaded to the personal computer, the new Infogate allows users to work with data on the host. "Users can now look at the data on a mainframe as if it was stored locally on the PC," Conrad explained.

Both Goldengate and Infogate are used primarily in Cullinet shops, according to Conrad.

Reseller

CONTINUED FROM PAGE 43

be looking at a competitive product. But those features that are built into the new version are really not incrementally that valuable to the old user.

Many users complain that Lotus and Ashton-Tate Corp. have not upgraded their products frequently enough.

Anybody who says that probably forgets about how much pain and aggravation is involved in the upgrade. If you look at organizations with 10,000 copies of 1-2-3, most haven't finished the old upgrade.

What kind of pricing can we expect for applications under IBM and Microsoft Corp.'s OS/2?

I don't believe that applications that are here today and running on OS/2 tomor-

row will inherently be priced higher. There are certain applications that haven't been able to be written today that will provide more value to the customer, and they may be priced higher.

You mean 1-2-3/3 or 1-2-3/G for OS/2 from Lotus wouldn't be priced higher than the current version?

I don't have a clue how it is going to be priced. My point is that if the customers are getting the same utility with 1-2-3/G as they are with 1-2-3, why should they pay more for it?

What are some of the more common complaints or problems that users have with software?

In general, it's compatibility issues, such as connections between hardware environments, and a lot of questions on printers. These issues will get much more complicated in an OS/2 environment.

Why is site licensing no longer a hot topic?

It was more a hot topic in the press than it was for customers. Site licensing has so many logistical problems that it never became a prevalent way of buying.

Even General Electric has recognized the significant cost that is actually associated with the logistics and distribution of the products that are supposedly "available free."

For most of your company's history, you sold IBM-compatible software. Why do you now also carry Apple Computer, Inc. Macintosh software?

We have seen the Macintosh appearing more and more as a second standard. I think the Macintosh has sort of come in the back door and is increasingly coming in the front door. It was important for us to provide support for those products.

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MICROCOMPUTING

Squashing bugs

CONTINUED FROM PAGE 41

tells us not to expect this product any time soon, however.

The other scuzzybutt circulating is that IBM is taking bids from various vendors on a SCSI adapter. Word has it that both NCR and Adaptec have bids in.

Revenge on the nerds. The folks at Lotus had some Halloween fun when many dressed up as Microsoft nerds resplendent in horn-rim glasses and rolled-up pants with nerd-packs in shirt pockets and slide rules in hand. Perhaps the Lotusonians were trying to get in the mood to write for Windows and the Presentation Manager. One Lotus insider suspected Microsofters were spoofing its rivals as well, saying, "they are probably all dressed as MBAs."

Revenge of the nerds. The Lotus action wasn't necessarily unprovoked. A *Computerworld* reporter took note of an article about Lotus's joint development agreement with IBM posted on the wall in the office of a Microsofter. Accompanying the article was a photograph of Jim Manzi that had a beard drawn on it. Must have been taken around 5 o'clock.

Pickin' on SQL. Pick Systems' Dick Pick apparently holds the concept of SQL in low esteem. "SQL is brain-damaged. These guys [SQL developers] that develop these packages have no idea what

real-world data management is all about. As a result, they are forcing a syntactical language-based approach on us which is dead wrong," he says.

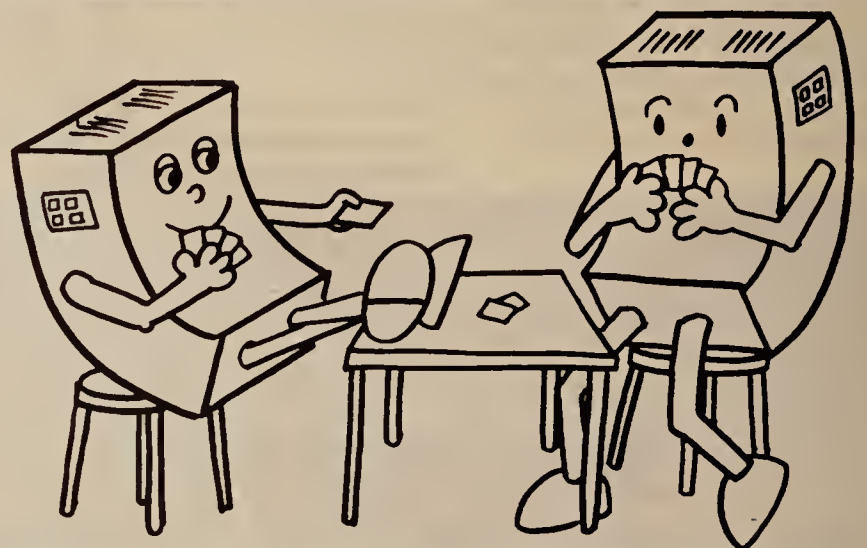
Pick, of course, says he believes the Pick system is a more intelligent approach to addressing the needs of large corporations in terms of shuttling data between large and small systems. Corporations "must have an efficient multiuser data management system and languages, and SQL doesn't even approach the problem of how to coordinate people accessing the same data base," Pick says. With OS/2 Extended Edition focusing a lot of attention on SQL during the last few months, we thought it might be nice to get the "loyal opposition's" viewpoint.

Brother, can you spare a disk?

Brother International is now test-marketing a software vending machine. To activate the machine, which is about the size of a soft drink vending machine, users insert either a credit card or cash. Users are then given a list of available packages to preview. In a few minutes, the diskette is delivered, complete with an abbreviated version of the selected program's documentation.

Yep, I can see it now. In cafeteria's across the country, there will be vending machines with selections that read: Coke, 50 cents; potato chips, 45 cents; 1-2-3, \$495. But imagine losing \$495 to a machine.

Scannell is a *Computerworld* senior editor, micro-computing.



WHAT'S YOUR COMPUTER DOING WHILE YOUR OPERATORS ARE WORKING?

If your computer sits idle or runs at less than peak capacity while your operations staff is changing shifts, checking job results, taking care of restarts, notifying users or manually adjusting production schedules, then perhaps an automated job scheduling and production control system should be in the cards for you.

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CONTROL-M provides the first NEW approach to automated job scheduling in almost a decade. With CONTROL-M your production keeps running because many tasks performed by your operators are automatically performed by CONTROL-M including:

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hotline, Novell delivers fast, reliable network support. And Novell product education courses provide in-depth information to help you get the most performance from your network.

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For network solutions,
you should be seeing red.

Unisys PCs

FROM PAGE 41

500, the two 286-based micros, and Windows/386 on the Model 800. Xenix is available for the Series 500 and 800.

The low-end system Series 300 is based on the 80286 and features user-selectable clock speeds of 8 and 10 MHz with

one-wait state. Random-access memory (RAM) is 640K bytes, expandable to 1.5M bytes. Storage choices include a 360K- or 1.2M-byte 5¼-in. floppy disk drive and 720K- and 1.4M-byte 3½-in. microfloppies.

The Series 300 has only two 8- to 16-bit expansion slots, however, and should interest MIS managers who want to maintain greater control over

their corporation's micros, according to Cyril Molnar, Unisys program marketing manager.

The Series 300 is set to be available in January in three configurations: diskless, for \$1,305; with one floppy drive of either format, for \$1,545; and with a 20M-byte hard disk, for \$2,380.

Unisys's Series 500 is a 6-, 8- or 12-MHz 80286-based micro. It features 640K bytes of RAM

standard, expandable to 4.5M bytes on the motherboard with a choice between a 20M-byte hard disk with a 40-msec access time or a 40M-byte hard disk with a 30-msec access time. Five expansion slots are included. The Series 500 is scheduled to be available this month. The diskless version is priced at \$2,495; the 20M-byte hard disk and floppy drive will cost \$3,390; and a

40M-byte hard disk version will cost \$4,585.

The Series 800 features a 16-MHz, zero-wait state 80386 chip or a 20-MHz, zero-wait state version. The systems come standard with 1M byte of RAM expandable to 8M bytes, seven full-length expansion slots and a choice of 40M-, 698M- or 116M-byte hard disks.

Availability is slated for this month, with the 16-MHz, floppy-drive system priced at \$4,780; the 40M-byte version priced at \$6,180; and the 69M-byte hard-disk version priced at \$7,585. The 20-MHz, floppy drive version is priced at \$5,280; the 40M-byte-drive version costs \$6,680; and the 69M-byte version costs \$8,085.

Network upgrade

Unisys also enhanced its Usernet network with IBM Token-Ring support running at 4M bit/sec. with the ability to link more than 100 workstations and servers within a building or complex.

Usernet is said to offer network management software allowing a workstation to monitor network activities. The software reportedly provides the capacity to log additions and deletions of nodes and measure ring frequency. An existing software interface from Unisys, the Synchronous Terminal Emulation Program, is intended to bridge the PCs to higher end Unisys minicomputers and mainframes.

Monitor selections for the Personal Workstation 2 series include a 12-in. green phosphor monitor for text editing, priced at \$275; a 15-in. black-on-white monochrome version, priced at \$600; and a 14-in. IBM Enhanced Graphics Array (EGA)-compatible display supporting up to a 640- by 350-pixel EGA, priced at \$725.

Alis OA tools

FROM PAGE 41

amounts of random-access memory, the product provides multitasking. Users can have up to 20 windows open at one time with each performing a different task, said Anthony M. Goschalk, director of marketing for Applix.

A typical configuration would be a network of 80386 machines, tied to a network server, Goschalk said. The product does not require a network server, he added. Alis contains word processing, freehand drawing and a spreadsheet.

Although intended for single users, the product can serve as a multiuser application for small work groups or departments. According to Goschalk, four to eight people can effectively use the system through character terminals.

Alis will sell for \$1,945 for a single-user license and will ship within 90 days, Goschalk said.

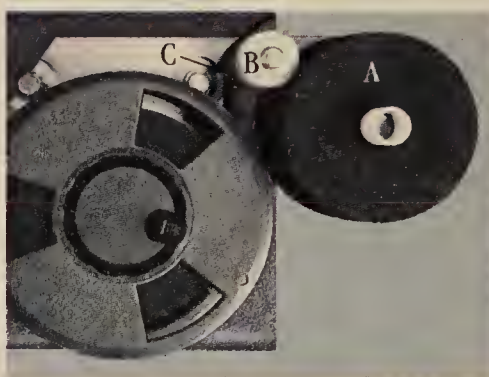


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NEW PRODUCTS

Systems

A hard-disk version of the **Multispeed** IBM-compatible laptop computer has been announced by **NEC Home Electronics, Inc.**

The Multispeed HD features a 20M-byte hard disk, a 3½-in. floppy disk drive, an electroluminescent backlit supertwist LCD and a two-speed NEC V-30 pro-



NEC's Multispeed HD

cessor. The computer is said to weigh 14 lbs.

Other features include 640K bytes of random-access memory; 512K bytes of read-only memory; resident pop-up software; an RS-232C serial port; a Centronics Data Computer Corp.-compatible parallel printer port; a red-green-blue video port; and a floppy-disk controller/floppy-disk expansion port.

The Multispeed HD is priced at \$3,695.

NEC Home Electronics, 1255 Michael Drive, Wood Dale, Ill. 60191. 312-860-9500.

Software applications packages

Two financial application packages for Microsoft Corp. MS-DOS-compatible personal computers have been announced by **United Financial Services.**

In **Stride**, a loan amortization program, features amortization schedules for conventional, new Federal Housing Administration, Jumbo, Balloon and per 1,000-type mortgages as well as quarterly, semiyearly, yearly, semimonthly, weekly, biweekly and serial loans and mortgages.

The second package, **Financial Handbook**, contains 17 customized programs. Included are depreciation methods and loan comparisons.

In **Stride** costs \$140. **Financial Handbook** costs \$170.

United Financial Services, P.O. Box 364, 81 Endicott St., Weymouth, Mass. 02188. 617-698-4655.

Perfect Care has ported its **Perfect Care Medical System** for small to medium-size physicians' practices to the IBM Personal System/2.

The system includes such applications as patient and insur-

training and installation costs \$13,700.

Perfect Care, Suite C-107, 251 W. DeKalb Pike, King of Prussia, Pa. 19406. 215-768-9030.

Software utilities

A graphics conversion and capture utility has been announced by **Inset Systems, Inc.**

The software, called **Hijaak**, is said to convert graphics file formats with full resolution and to grab data from the screen or from Hewlett-Packard Co. Laserjet output for larger-than-screen images.

According to the vendor, Hijaak's convert facility provides more than 66 file-translation paths.

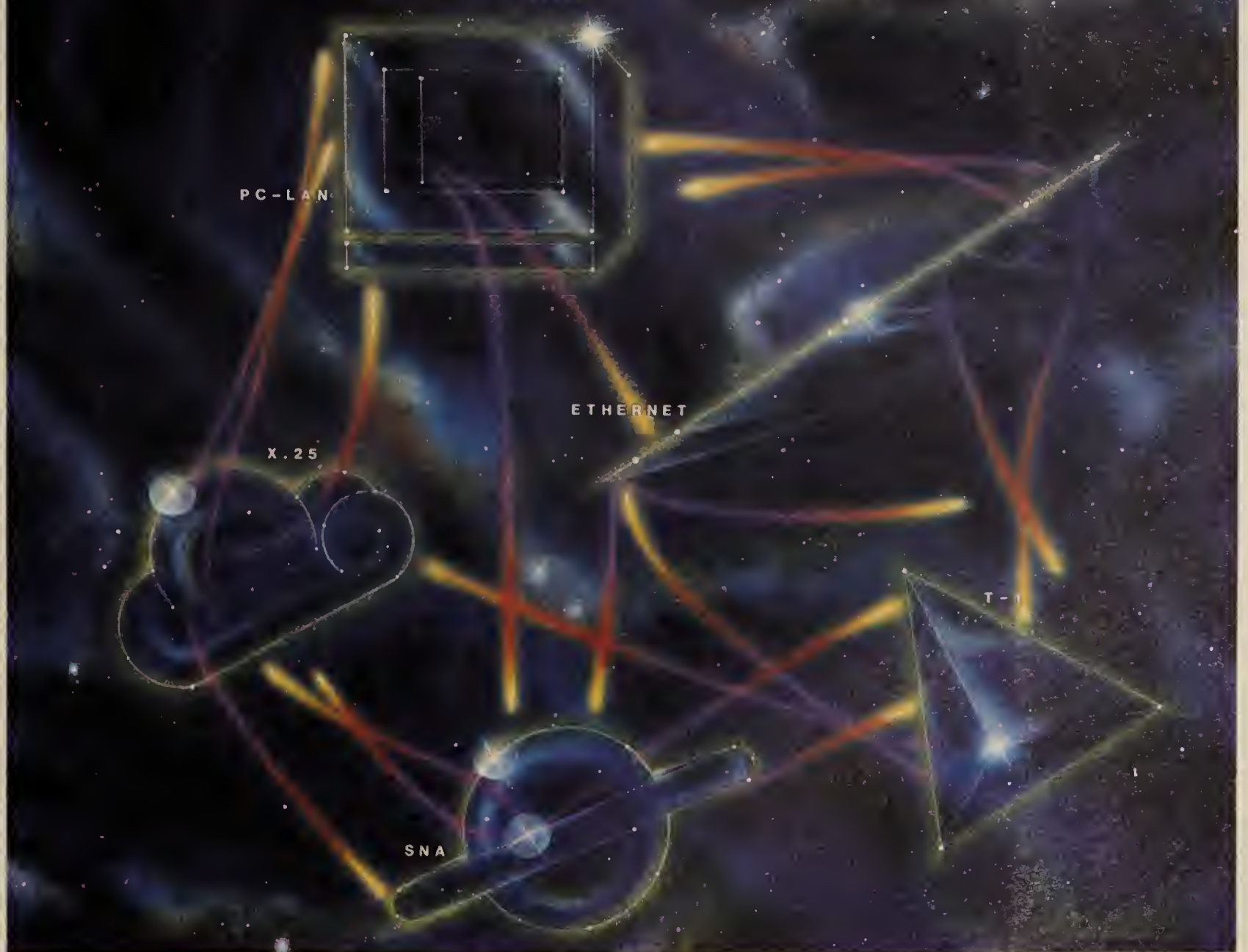
The product's memory-resi-

dent screen-capture program takes snapshots from text or graphics screens from IBM's Color Graphics Adapter and Enhanced Graphics Adapter as well as AT&T's DEB 6300 and Hercules Computer Technology, Inc. adapters.

Hijaak costs \$89.

Inset, 12 Mill Plain Road, Danbury, Conn. 06811. 203-794-0396.

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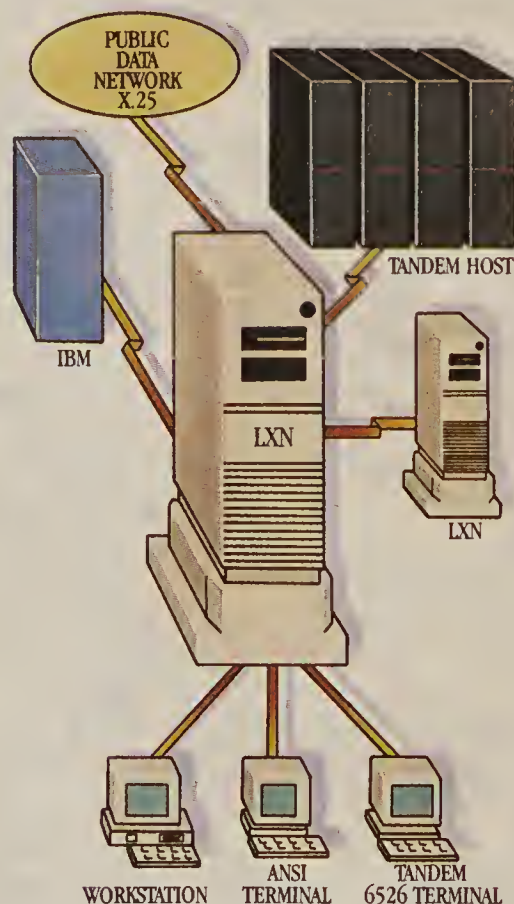
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LXN.™

Our lowest-cost system integrates UNIX™ into the Tandem OLTP network.

GOOD CONNECTIONS.

The LXN system integrates easily into the Tandem transaction processing network. You can access



both Tandem host applications and UNIX applications, as well as other hosts through SNA or X.25. You can connect PCs to LXN through Ethernet LANs,

then LXN to other systems. A MS-DOS file server provides availability benefits of LXN to PC users.

HIGH AVAILABILITY.

Tandem is the first to bring OLTP features to UNIX in this price range. The system can support two mirrored disks. If one fails, the other takes over. In case of power failure, an uninterruptible power supply will run the entire system for up to five minutes. It will also send everything in memory to disk. When power is restored, auto restart resumes where you left off, maintaining data integrity.

APPLICATION POWER AND PORTABILITY.

Now you can run your UNIX applications and access the Tandem OLTP network — all from any workstation. The power comes from a 32-bit microprocessor. It's backed by a 1.6 megabyte floppy disk drive, 80 or 170-megabyte hard disk storage

and a 60-megabyte streaming cartridge tape drive.

EASY TO EXPAND.

As you add users, add processor and memory boards. In a fully configured system, memory can expand to 16 megabytes, with 510 more megabytes of hard disk storage. LXN can support up to 32 users and take a huge workload off your mini or mainframe.

EASY TO SERVICE.

A menu-run test allows office workers to check out the entire system. All key components are field replaceable. Diagnostics can be run locally or remotely from a Tandem service center.

EXTEND YOUR TANDEM NETWORK OR START ONE.

Now it's easily affordable. Whenever there's a need for constantly current information, efficient expandability and unbeatable price performance, Tandem technology proves consistently superior. Compare us to any other OLTP system. You'll see why companies in every major industry choose Tandem.

For information, write: Tandem Computers Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014. Or call 800-482-6336.

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Three theories behind the creation of a new system.

WYSE

The Big Ban



g Theory.



In the beginning, there was power. When Wyse engineers set out to create a new personal computer family, their objective was not merely to design a new system, but to design a new *design*. Criterion one was power with total compatibility: higher performance for industry standard operating systems and applications. Today's and tomorrow's.

Introducing SystemWyse[™], a comprehensive system for creating solutions. At its core are four new Wyse computers which set higher standards of performance for every level of PC user.

At the top, the new WYSEpc 386 has one of the highest benchmark ratings yet for a personal computer. Our unique design harnesses the 16 MHz 80386 microprocessor to achieve exceptional memory speed as well as processing speed. The result is a zero wait state system for high speed processing on multiple operating systems, such as MS-DOS[®], OS/2[™], and Xenix[®]. As an engineering work station, a high power spreadsheet processor, a multi-user system, or a network server, it is a system to satisfy the insatiable.

The same Wyse design ingenuity maximizes the effective power of the 80286 microprocessor as well. In our 8 MHz general purpose 286, our 12.5 MHz professional desktop system, and our 12.5 MHz zero wait state high performance system. At Wyse, overachievement just seems to run in the family.

The WYSEpc 386 driving our VGA color monitor. WyseWindow[™] LCD provides system status and activity readout.

WYSE
■ ■ ■ ■

We make it better, or we just don't make it.

The Theory

Survival of the system demands the ability to adapt to an ever-changing environment. Traditional PC design applied to most systems today virtually guarantees their extinction sooner rather than later.

It occurred to the Wyse engineering team that, with rapid change the only true constant, the intrinsic ability to adapt readily to new technology was essential in the ideal PC design.

For example, by incorporating all active functions on plug-in cards, we could make upgrading or reconfiguring our computers literally a snap.

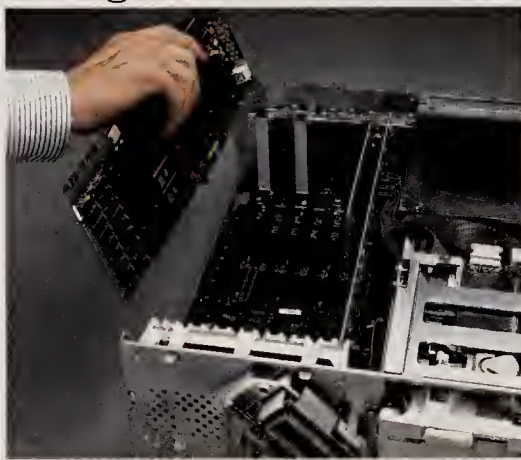
From this simple concept emerged the most practical PC design of the '80's—and 90's: the Modular Systems Architecture™ we developed for SystemWyse.

This new design gives PC purchasers, at last, a means to protect their investment against Dreaded Obsolescence. The CPU itself is a plug-in card. So, for example, you can upgrade our general purpose 8 MHz model to a 12.5 MHz high performance 286 machine—or even a 16 MHz 386—as easily as you'd add a graphics board to a traditional system. And when more powerful microprocessors are available, you'll even be able to boost the



power of our top-of-the-line WYSEpc 386.

To achieve such flexibility, Wyse applied mini-computer design concepts to the internal architecture of our PCs. Our new passive back plane accommodates as many as 10 plug-in cards that perform all necessary functions, and then some.



It's this easy to upgrade CPUs—and boost the power—of a SystemWyse PC.

of Evolution.



With total interchangeability. Wyse already makes available a wide array of graphics, memory expansion, and interface modules.

Our design also increases ease of repair and accommodates customized configurations *ad, virtually, infinitum.*

In a world in which survival belongs to the fittest, the only true survivors are those with the capability to remain fittest, longest. This is a theory applied with great practicality in SystemWyse.

Three SystemWyse graphics solutions: our 8 MHz desktop with a Wyse VGA monitor; our 12.5 MHz professional desktop and VGA color monitor; and our 12.5 MHz, zero wait state system driving the WY-700 hi-res graphics display.

WYSE
| | | |

We make it better, or we just don't make it.

The Theory

It all works together.

Most of all, SystemWyse is a system for creating solutions. Uniquely integrated solutions that range from desktop publishing installations and powerful CAD/CAE workstations, to 16-node multi-user systems. All are based on industry standard operating systems, with over 1000 *tested* applications available.

At the heart of SystemWyse are our Modular Systems Architecture computers. They're the most powerful PC family in the business. And, with more possible configurations, the most flexible.

But SystemWyse also encompasses an entire catalog of compatible, superbly designed peripherals. Including one of the industry's most popular lines of computer terminals. Color and monochrome monitors (VGA, EGA and CGA compatible) and high resolution graphics subsystems.

Plus memory expansion, graphics, and interface modules. All are designed and manufactured by



A SystemWyse Desktop Publishing solution: our 12.5 MHz professional system coupled with our WY-700 hi-res graphics subsystem.

Wyse to link effortlessly, and work together in singular harmony.

It's all driven by a unified design vision. That's why SystemWyse has a look and feel that's consistent throughout. Computers and terminals with identical screens and keyboards. Styling that has set a new standard for the industry. And user-oriented features that are the hall-



WYSEpc 386 drives our 19" color monitor for CAD/CAE applications.

mark of Wyse design.

Such as the advanced ergonomics. The crisp characters and high resolution screens of our terminals. The clarity and vivid colors that distinguish our monitors. The built-in help facility and simplified set-up menus of our systems.

Standing behind our ability to deliver on the promise of SystemWyse is our unique manufacturing capability. As one of the industry's most vertically integrated producers, we make all our own

of Relativity.



products. And we make virtually everything from the ground up. While most companies use sub-assemblies purchased from someone else, we gain infinitely greater manufacturing control by beginning with components.

The result is a means to create solutions of manifestly superior quality and value. Solutions that are at once both elegant, yet relatively easy to construct. Solutions that seem custom designed for each specific application. We call them, simply, "SystemWyse solutions."

A WYSEpc 386 powered multi-user system, with our WY-60 alphanumeric and WY-99GT graphics terminals as work stations. All peripherals link to the system with simple telephone-type connectors.

WYSE
| | | |

We make it better, or we just don't make it.

The conclusive support for our theories.

As we've developed System-Wyse, we've continued to develop a comprehensive and effective support program. It's been designed to meet all your needs, from the moment you purchase your system. It starts with documentation

It's the kind of support that's helped Wyse become second only to IBM in manufacturing terminals*, with over one million shipped. And it's all part of SystemWyse. Which makes our concepts of power, flexibility, and connectivity three of the best supported theories around.

For more information about SystemWyse, call today or mail the coupon below.

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*IDC 1986 U.S. Terminal Census.

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that is both thorough and understandable. For easy-access post-sale support we provide a staff of technical experts in the field plus a hotline to answer your questions. And you are probably now within 50 miles of a Wyse service center. We also conduct continuous software testing to ensure compatibility and beta site testing for independently developed custom applications.

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3571 N. First Street, San Jose, CA 95134.

WYSE

We make it better, or we just don't make it.

EMM, a software package said to provide bank-switched expanded memory for IBM Personal System/2 Models 50 and 60, has been announced by **Fort's Software**.

F-EMM is an expanded memory manager that reconfigures and manages IBM's memory board to be expanded memory.

It supports software written for the original Lotus/Intel/Microsoft Expanded Memory Specification (EMS) 3.2, the Enhanced EMS 3.2 and EMS 4.0.

F-EMM costs \$59.95 plus \$3 for shipping and handling.

Fort's Software, P.O. Box 396, Manhattan, Kan. 66502. 913-537-2897.

Development tools

Emulation of IBM's IMS designed to run on IBM Personal Computers and compatibles has been announced by **Micro Focus, Inc.**

The **IMS Option for Micro Focus COBOL Workbench** is said to emulate IBM's IMS/VS, providing an IMS development system in which to code, test and run mainframe IMS applications. It includes both data base and data communications support.

Support is included for DL/1 functions and command codes, Segment Search Arguments, data communications functions such as IBM 3270 emulation, message editing and conversational, pseudoconversational and queue-driven programs. The IMS Option with VS COBOL Workbench Version 2.0.2 costs \$4,250.

Micro Focus, 2465 E. Bayshore Road, Palo Alto, Calif. 94303. 415-856-4161.

Software enhancements

Geocomp, Ltd. has announced **Easydij Version 5.0**, an enhanced release of its digitizing and measuring program for the IBM Personal Computer.

According to the vendor, Easydij allows digitizing of map, photograph or drawing data regardless of the placement of the drawing on the digitizer surface. It corrects for drawing skew and measures dimensions, line lengths, areas and volumes. It supports any digitizers that send ASCII coordinates to the RS-232 serial port of the PC.

Features of Version 5.0 include buffer-end I/O, the ability to write up to 328 coordinate pairs into a file per minute and retention of programs' default and parameter settings.

Program licenses cost \$335 each.

Geocomp, 749 Van Gordon Court, Golden, Colo. 80401. 303-233-1250.

Training

An enhanced version of the **DS Tutor** interactive training program, which teaches users how to use a personal computer and its disk operating system, has been announced by **Design Software, Inc.**

Features of the enhanced version include an interactive test section that poses questions to the student, records the answers and prints out the finished test, including the percentage of correct answers; block diagrams that outline the components of the operating system and their relationships to the hardware; and an electronic bookmark that lets users exit from the instructional program and pick up at the same point at a later time.

DS Tutor Release 1.1 is priced at \$39.95.

Design Software, 1275 W. Roosevelt Road, West Chicago, Ill. 60185.

Printers/Plotters/Peripherals

A pair of 24-pin printers offering bidirectional printing in text and graphics modes has been introduced by **Epson America, Inc.**

The printers, the **LQ-85** 80-col. model and the **LQ-1050** 136-col. model, feature print speeds of 264 char./sec. in draft elite mode and 88 char./sec. in letter-quality elite mode. Also included is the ability to print a single sheet without first removing the continuous-feed paper from the tractor feed. A built-in tear-off bar, in conjunction with autofeed, micro-line adjustment and top-of-form memory, permits users to print multipart forms.

Other features include built-in letter-quality roman and sans serif fonts, a front control panel, a 6K-byte buffer and parallel and serial interfaces.

The LQ-85 and the LQ-1050 cost \$799 and \$1,099, respectively.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505. 213-539-9140.

Board-level devices

Cobra, a graphics processor, has been unveiled by **Vermont Microsystems, Inc.**

The personal computer-based processor is said to draw images at the rate of 80,000 clipped vector/sec. It offers 1,024-by-800-pixel resolution, 16 to 256 simultaneous colors from a palette of up to 16.7 million and support for graphics application packages.

A 16-color 4,096-palette version of Cobra costs \$2,995; a 256-color 4,096-palette version costs \$3,795; and a 256-color 16.7-million palette costs \$4,195.

Vermont Microsystems, P.O. Box 236, 11 Tigan St., Winooski, Vt. 05404. 802-655-2860.

NEW AT COMDEX/FALL '87

Acer Technologies Corp. introduced a desktop publishing system that combines the company's **LP-75** 6 page/min laser printer and its Intel Corp. 80286-based personal computer.

Also included is a 12-in. monochrome monitor, a desktop publishing software package, a mouse and Microsoft Corp. MS-DOS 3.2. It costs \$5,595. Acer, 401 Charcot Ave., San Jose, Calif. 95131. 408-922-0333.

Advanced Vision Research announced **Megascan 3.0**, an enhanced version of its software for scanning, image manipulation, text editing and laser printing.

Features include the ability to save files in such file formats as the company's .MSI; the GEM .IMG format; and Aldus Corp.'s .TIF

Advanced Vision Research also introduced **Megafont**, a software accessory for creating fonts in a Hewlett-Packard Co. soft-font format, and **Megaread**, a user-trainable optical character-recognition software program.

The Megascan system, including a scanner, a Megabuffer card and Megascan software, costs \$2,695. Megafont

costs \$250, and Megaread costs \$495. Advanced Vision Research, 2201 Qume Drive, San Jose, Calif. 95131. 408-434-1115.

Verticom, Inc. announced a software driver option for its H-Series color graphics controllers. **Twinfocus** reportedly allows users of Autodesk, Inc.'s Autocad to display two interactive windows at once. It also increases zoom and pan speed, the vendor said. Twinfocus costs \$195. Verticom, 545 Weddell Drive, Sunnyvale, Calif. 94089. 408-747-1222.

Dest Corp. introduced the **PC Scan 1000** and **2000** series of desktop scanners that interface with IBM microcomputers.

PC Scan 1000 incorporates a flat-bed design with 16 levels of four-bit gray scanning and image resolution up to 300 dot/in. PC Scan 2000 offers eight-bit gray-scale scanning of up to 256 levels of image data. Prices range from \$1,495 to \$2,395. Dest, 1201 Cadillac Court, Milpitas, Calif. 95035. 408-946-7100.

Quickplan, a personal computer software package for financial planning practices, was introduced by **Softbridge Microsystems Corp.**

It costs \$2,295. Softbridge Microsystems, 125 Cambridgepark Drive, Cambridge, Mass. 02140. 617-576-2257.

A 24-pin, letter-quality, 80-col. printer offering 180 char./sec. draft and 60 char./sec. letter-quality printing was announced by **Epson America, Inc.**

Called the **LQ-500**, the printer features friction feed and a pull tractor, built-in selectable roman and sans serif fonts, automatic single-sheet loading, bidirectional printing in text and graphics modes and built-in parallel interface. The LQ-500 costs \$499. Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505. 213-539-9140.

Brother International Corp. introduced the **M-2518** data processing printer, featuring speeds to 360 char./sec.

It includes standard parallel and optional serial interfaces, an optional dual-bin sheet feeder, an optional four-color ribbon and an optional font card. Pricing starts at \$1,295. Brother, 8 Corporate Place, Piscataway, N.J. 08855. 201-981-0300.

Uptime

Provide 24 Hour CICS Service

IBM gave dynamic allocation to CICS... but you need Netec's CAFC to make non-stop CICS a reality. CAFC allows a single command to OPEN or CLOSE 5 or 50 files. CAFC establishes two way communication between your CICS regions and your batch jobs. Your batch jobs will always have the files they need for processing without operator intervention.

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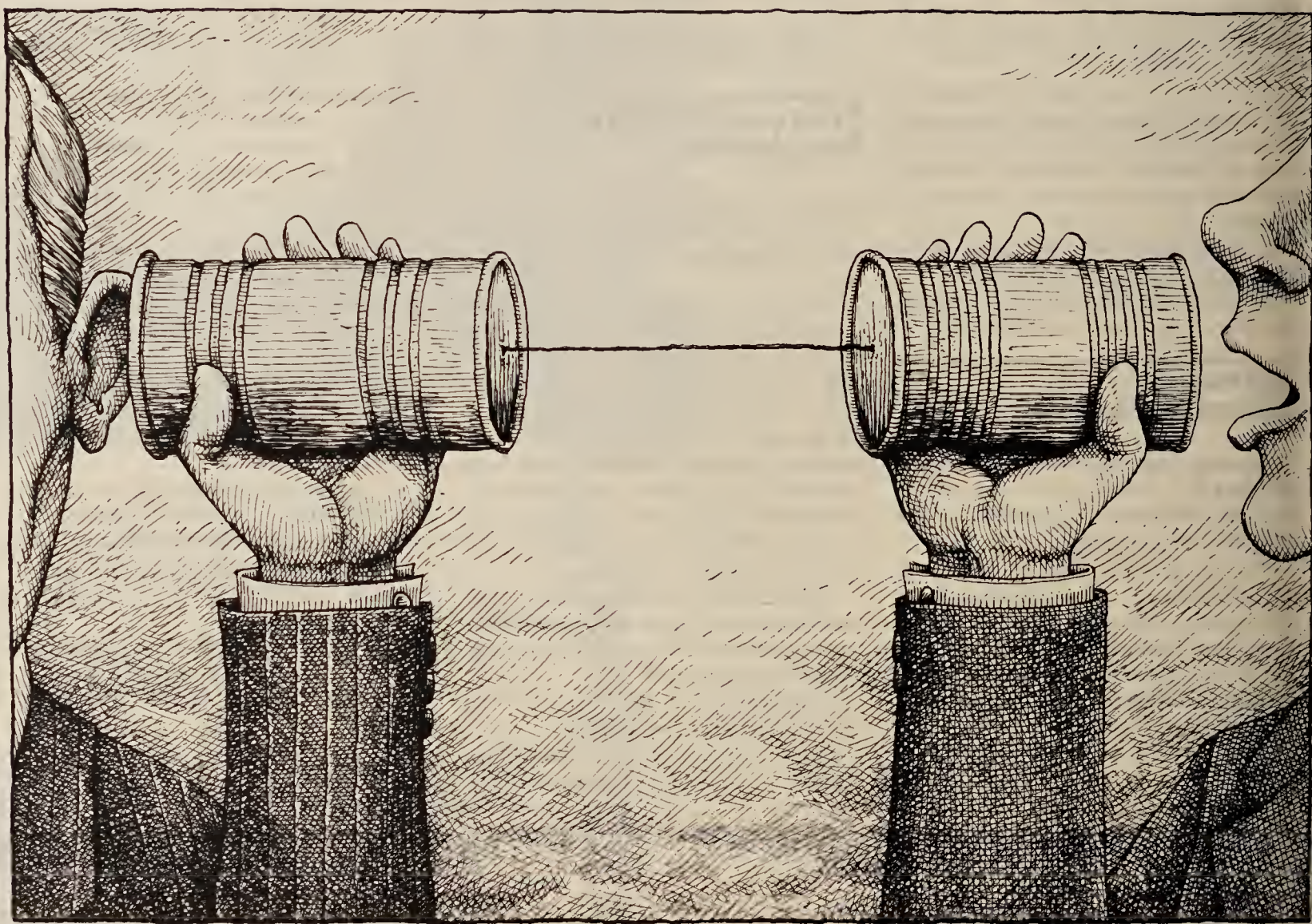
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NETWORKING

DATA STREAM

Elisabeth Horwitt

Let's raise our standard



In the last couple of years, vendors seem to have concluded that the term "standards-compliant" packs the same punch with MIS managers as "all natural" does with supermarket shoppers. IBM-backed de facto standards like LU6.2 appear to be winning as much support as "true" standards like Open Systems Interconnect (OSI).

Unfortunately, just as a food can be "natural" and still give you cavities and indigestion, computer systems can "comply" with an international protocol and still give the MIS manager a whopping networking headache. While vendors can and do provide the basic protocols for linking disparate systems, they continue to argue about what should go into the all-important application level. Often it remains up to the user to develop the applications to provide multivendor data base access, terminal-to-host sessions, network management and the like.

Some say vendors resist going beyond token standards support because they don't want to abandon the proprietary products and features with which they catch and keep customers. While some vendors hotly deny this, the fact remains that certain dominant players are dragging their feet in key standards areas — except when pressured by users who know what

Continued on page 68

Cincom seeks telecom crown

Firm aims Net/Master at kingpin Netview in bid to win market

BY ELISABETH HORWITT
CW STAFF

CINCINNATI — Cincom Systems, Inc.'s Net/Master, frequently cited as the only serious rival to IBM's Netview, is now challenging the computer giant's bid to dominate the telecommunications network management arena.

Cincom has been approaching telecommunications vendors and MIS managers who want a host-based telecommunications management system that offers the option of using IBM's Netview/PC as a way to send data to Net/Master.

So far, three vendors are using Netview/PC as a gateway to Net/Master, and one user is con-

sidering it, Cincom reported.

The interested vendors are: Netlink, Inc., a vendor of communications controllers for IBM systems; Avant-Garde Computing, Inc., whose multiwindowed workstation system competes with Netview/PC as an interface to other vendors' network management systems; and U.S. West, a regional Bell holding company that sells a network monitoring system.

Talking to others

Cincom is currently talking under nondisclosure with several other major telecommunications vendors, according to Net/Master product manager Thom Vollmar.

Net/Master's main advan-

tage over Netview lies in its Network Control Language (NCL), a fourth-generation language said to be far more flexible and functional than Netview's analogous product, C-Lists.

A recent report from Forrester Research, Inc. in Cambridge, Mass., cited "a 14-year IBM Raleigh veteran that was intimately involved in Netview development" as saying that Net/Master is "the only comprehensive competitor to Netview" and that it makes "Netview look sick," does not take as many resources as Netview and offers better ease of use.

Both application development tools allow users and third-party vendors to extend the network

Continued on page 60

LAN sales on rise; PC clusters down

Business customers will install fewer small PC local-area networks (LAN), or clusters, but they will buy general-purpose

LANs in steadily increasing numbers, according to a report that was recently released by New York-based research firm

Frost & Sullivan, Inc.

This year, personal computer cluster products will bring in revenues of \$173 million, and unit shipments will drop an average of 19% each year to \$36 million in 1991, the report stated.

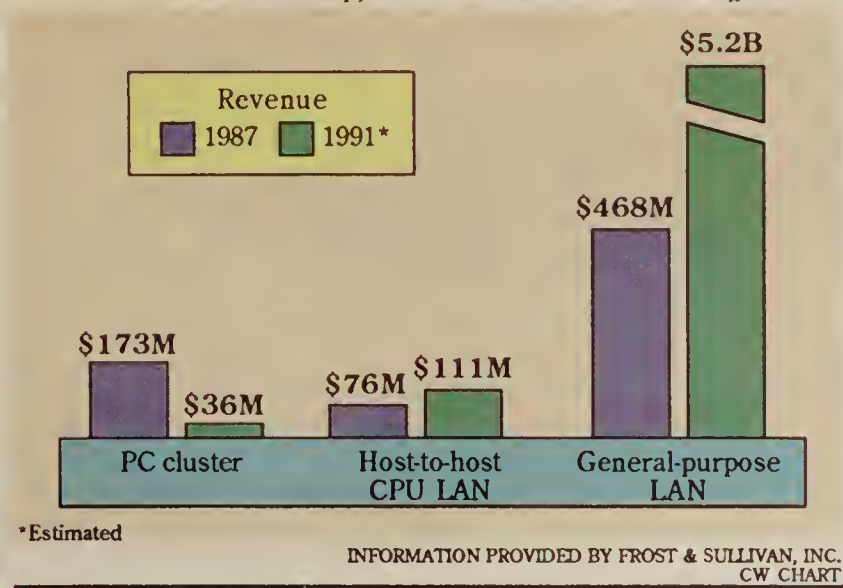
In contrast, backbone LANs, such as Ethernet, will double their unit shipments each year, reaching \$5.2 billion in revenue by 1991, the report said.

One contributing growth factor is an expected 8% annual drop in cost per connection from approximately \$828 in 1986 to 1991's projected level of \$533, Frost & Sullivan said.

A third networking segment, high-speed channel-based host networks, should show a comparatively modest cumulative revenue growth of 146% during the five-year period, or approximately 30% per year, the research firm predicted.

Window on three networking segments

PC cluster revenues will drop, local-area networks will take off



Novell Mac products to debut

BY KATHY CHIN LEONG
CW STAFF

MOUNTAIN VIEW, Calif. — Betting that Apple Computer, Inc.'s Macintosh II will be a hit with Fortune 1,000 MIS shops, Novell, Inc.'s Communications Products Division, formerly CXI, Inc., last week unveiled the first in its series of Mac-to-main-frame communications products.

The new offerings include the PCOX/Coax-M coaxial interface board, PCOX/Multi-M terminal-emulation software and PCOX/3270 SR-M file-transfer software. The products have just entered beta testing.

These products represent Novell's first stab at the Apple market, said Communications Products Division President Philip Lumish. He stressed that the Apple market will become increasingly important to his division.

The first round of Mac products, scheduled for availability at the end of this month, were designed so that a single Macintosh user can tap into an IBM mainframe. Taking the conservative route, Lumish disclosed that the three products were patterned in functionality after the existing CXI line of PCOX boards for the

Continued on page 65

Inside

- Cincom updates Net/Master. Page 60.
- Western Digital plans OS/2, Unix support for new operating system. Page 65.
- Xyplex rolls out Network Printer Controller. Page 69.

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Net/Master 2.0 tracks data, analyzes MVS

BY ELISABETH HORWITT
CW STAFF

Continuing its efforts to stay at least one step ahead of IBM's Netview, Cincom Systems, Inc. recently announced availability of Net/Master Version 2.0, which is said to offer improved performance from the previous version of the network management system.

One of the enhancements — the Network Tracking System — tracks a data stream through each network node, storing the information for later problem analysis and accounting purposes, according to Cincom Net/Master product manager

Thom Vollmar.

The Network Tracking System reportedly fulfills the same role as IBM's Session Monitor.

A second addition, Sys/Master, allows a network manager to analyze IBM MVS operating system functions from a remote site, according to Vollmar.

No more waiting for tasks

Version 2.0 also allows users to initiate several Network Control Language (NCL) procedures concurrently under the same identification number instead of having to wait for each task to be completed before going on to the next, according

to Vollmar.

"When a network problem comes up, you may have to bring up first VTAM, then CICS, and now you don't have to wait until one task is done before starting another," he said, referring to IBM products.

Also under the new version, NCL procedures can be stored in the extended addressing space of IBM's MVS/XA operating system, significantly increasing the amount of storage space available, according to Cincom.

Net/Master carries an average price of \$30,000, depending on the customer's processor.

Cincom

CONTINUED FROM PAGE 59

management system's capabilities. For example, C-lists could be used to create a routine whereby an IBM 9370 could first diagnose whether an IBM Token-Ring network was up and running before downloading data to a network node, according to Ellen Hancock, president of IBM's Communication Products Division.

While a number of vendors now send alerts to Netview via Netview/PC, both they and corporate MIS are having trouble generating host-based applications using C-lists, according to Thomas McDonald, a principal consultant at Natick, Mass.-based MGT Technology Group, Inc. "People still don't know how to implement C-lists," McDonald said. "My clients are doing it, but slowly."

Anheuser-Busch, Inc. chose Net/Master over IBM's Network Problem Determination Application and Network Communications Control Facility network management software programs, which, at the time, had not been merged under the Netview umbrella, according to Dennis Turek, a software analyst at the firm.

Turek said he values the flexibility of Net/Master's NCL over Netview's C-list for creating customized applications.

"Neither product provides more functionality; the difference lies in the way you get to it," said Netlink spokesman Richard Buckle. Netlink has, at customers' requests, linked its communications devices to both Net/Master and Netview. The vendor found that "it was far easier to get things up and in place with Net/Master."

Several of the improvements that IBM recently made to Netview are, at least in part, a response to the Netmaster threat, industry sources claimed.

With its June Solutionpac introduction, IBM tried to address Netview's shortcomings in the generation of automated network management processing, "which have people tearing their hair," McDonald said. The Solutionpac service provides IBM programmers who "establish automated procedures" for customers, he explained. However, the service does not provide tailored applications, but "simple network management solutions to start you on your way," he said.

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Datatel takes swing at T1 field

CHERRY HILL, N.J. — Datatel, Inc. last week unveiled its first T1 networking system, the DCP 9000, which reportedly supports up to 18 T1 lines. An IBM Personal Computer-based network management system, which can be implemented at any network node, performs monitoring, configuration and diagnostic data collection, Datatel said.

The DCP 9000 is said to support dynamic bandwidth allocation and to comply with AT&T's Digital Access and Cross-Connect System (DACS). This allows the device to interface with DACS-compliant devices and services such as AT&T's Accunet, the vendor said.

The basic product is priced at \$20,000. T1 boards can be added in a modular fashion at a price of \$1,500 apiece. Support for the 2M bit/sec. European T1 standard is planned, Datatel said.

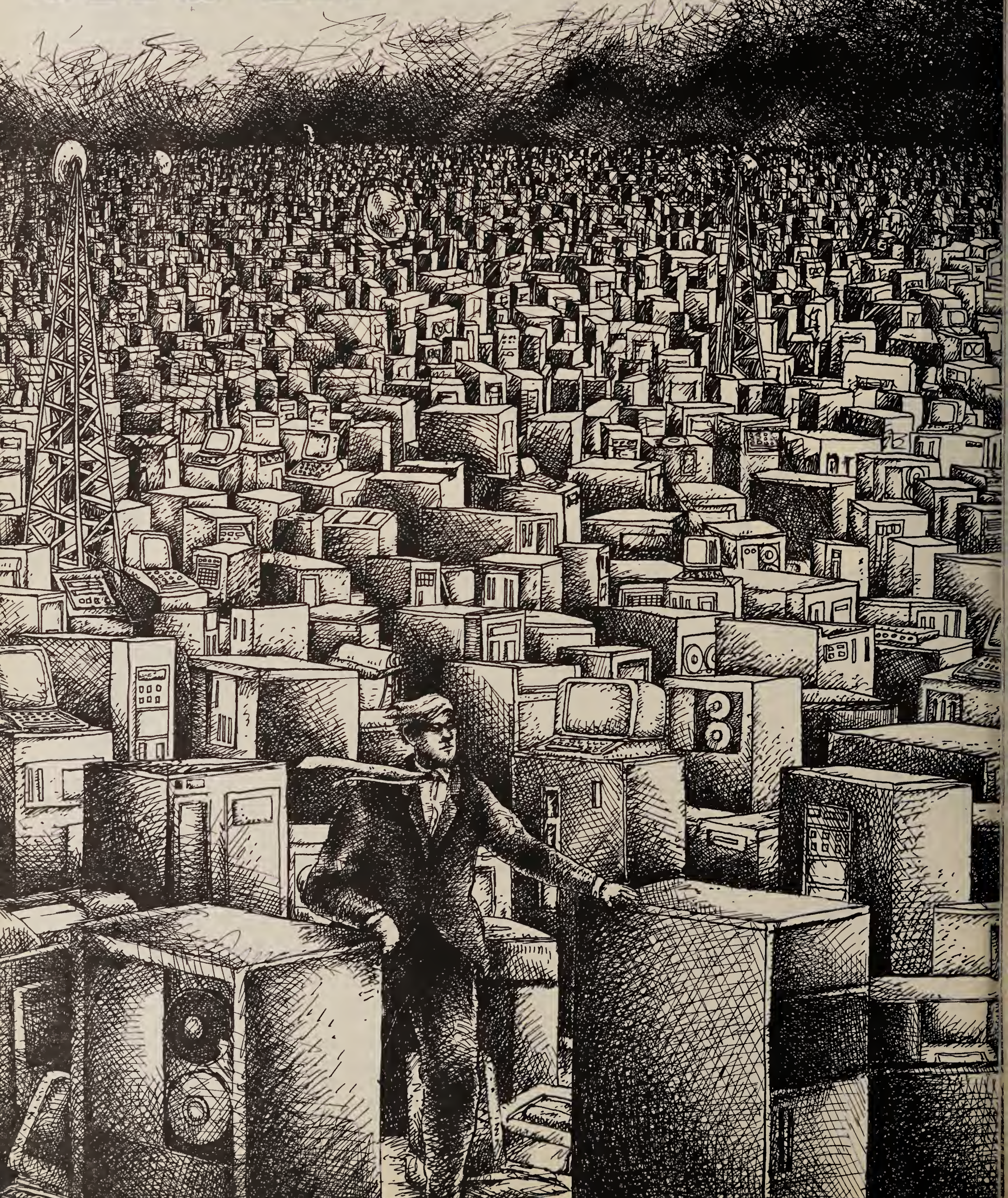
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IBM signs up telecom firms to forge links with CPUs

BY ELISABETH HORWITT
CW STAFF

IBM has signed agreements with two regional Bell holding companies and a foreign switch manufacturer for the purpose of investigating how its computers can be integrated with telecommunications services and equipment.

At the Telecom '87 conference in Geneva, IBM announced a nonexclusive agreement with Bell Atlantic Corp. to

jointly "define and implement intelligent network voice and data applications," according to C. M. Armstrong, president director general of IBM Europe. Typical applications would include credit card validation for telephone calls and virtual networks that provide dial-up users with features that are normally provided over private communications lines, Armstrong noted.

Under the agreement, the companies will explore ways of integrating IBM com-

AN AGREEMENT between IBM Germany and German switch manufacturer Siemens AG calls for those companies to jointly develop intelligent network applications.

puter systems with Bell Atlantic's installed base of central office switches and the customer-premise equipment used by the Bell holding company's customers.

Exploring links

An agreement between IBM Germany and German switch manufacturer Siemens AG calls for those companies to jointly develop intelligent network appli-

cations and to explore ways of linking IBM computers and Siemens switches using international standards such as Integrated Services Digital Network (ISDN), IBM said.

Siemens confirmed that it will support IBM's Netview/PC network management interface.

IBM recently agreed for the first time to participate in a U.S. ISDN field trial [CW, Oct. 26]. That trial, which will involve Nynex Corp.'s premises and switching systems, is intended to allow IBM to evaluate how its Systems Network Architecture connections run over an ISDN Basic Rate Interface and "whether the 64K bit/sec. speed will allow us to provide additional capabilities for applications," said IBM ISDN systems manager John McElroy.

IBM's new projects were announced during the same period that rival Digital Equipment Corp. unveiled its Computer Integrated Telephony program, a series of agreements with switch vendors to integrate DEC VAX applications with those of private branch exchanges and, later, central office switches, according to the vendor.

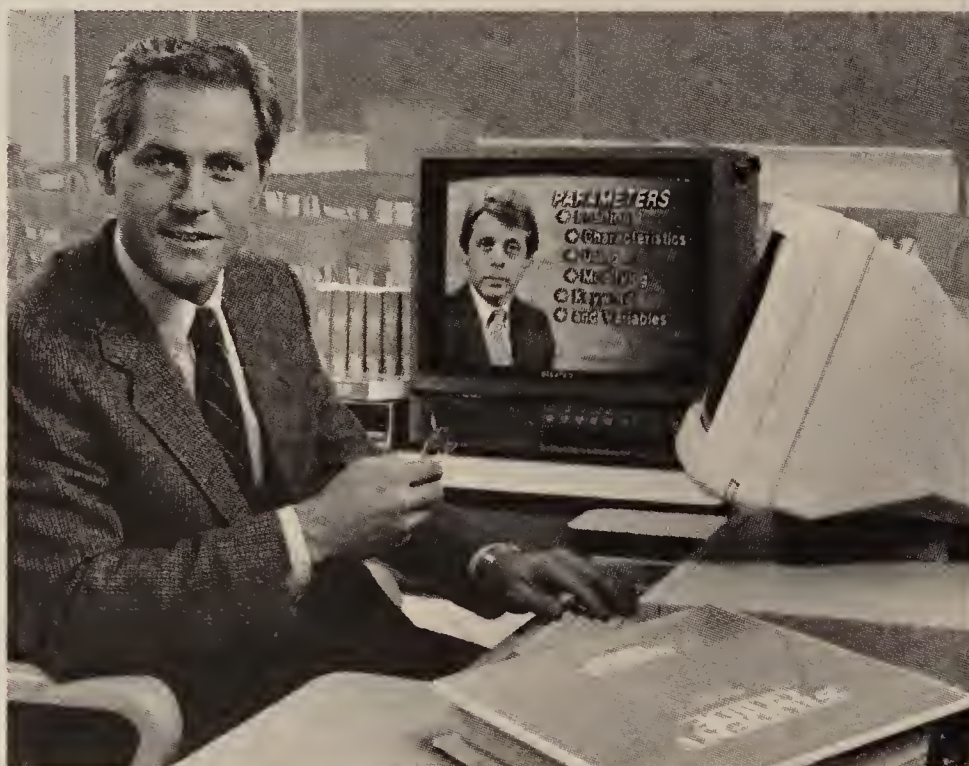
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AT&T offers international custom service

WASHINGTON, D.C. — AT&T has announced a customized private-switched international service that it said offers multinational business customers an alternative to international long-distance services and dedicated private-line services.

In an Oct. 23 filing with the Federal Communications Commission, AT&T said its International City Center Service (ICCS) will provide a dedicated custom telecommunications path on shared dedicated international facilities between customer-designated stations in the U.S. and locations overseas.

Initial ICCS service will be offered from New York to London in cooperation with British Telecom International and will later be extended to other major international locations, depending on the market demand.

The service, which offers point-to-point, two-way transmission of both voice and data, reportedly provides the benefits of shared private-line service to customers with medium to heavy telecommunications volume to specific international locations.

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IT BLAST

3Com reworks reseller plan

3Com Corp. has announced a cooperative selling plan designed to integrate its own reseller channels with the internal sales force of its Bridge Communications Division. Resolution of potential distribution channel conflicts is a top priority for the recently completed 3Com-Bridge Communications, Inc. merger, according to industry observers.

3Com hopes that the new plan will attract corporate accounts by combining its own strengths in personal computer work group networking with Bridge's direct sales expertise in multivendor environments, the company said. The most immediate impact on Bridge users, according to 3Com President William Carrico, is that their sales contacts will have beefed up their 3Com product offerings.

Minnesota's first Integrated Services Digital Network (ISDN) site trial got off the ground last week. Voice, data and facsimile transmissions traveled over ISDN links between the Hubert Humphrey Metrodome in Minneapolis and Control Data Corp. corporate headquarters in Bloomington. The links passed through the central office site of regional Bell operating company Northwestern Bell.

Alloy Computer Products, Inc. in Framingham, Mass., is now shipping its most recent Interface/2 adapter, which allows IBM Personal Computer XT boards to interface with IBM's Micro Channel bus. This allows users of Alloy's PC-Plus network to migrate to IBM's newest PC architecture, the vendor said.

Unisys Corp. recently unveiled a high-speed Distributed Communications Processor (DCP) designed to provide three times the throughput of its predecessor while acting as a front-end processor or remote concentrator for Unisys 1100 series mainframes. The DCP/50 is code-compatible with other Unisys DCP models and is rated at 135 transaction/sec., Unisys said. It occupies half the space of the DCP/40. Pricing ranges from \$280,000 to \$1.5 million.

Novell Mac

CONTINUED FROM PAGE 59

IBM Personal Computer family.

The \$545 PCOX/Coax-M works with the Mac II Nubus architecture and includes a 10-MHz Intel Corp. 80186 microprocessor with 512K bytes of memory, Lumish said. The board requires COX/Multi-M terminal emulation software. The software emulates IBM 3178, 3179, 3278 and 3279 terminals.

Priced at \$100, the PCOX/3270 SR-M software package reportedly enables a user to send or receive binary or text files from the host mainframe. Lumish noted that since the Mac II machines will take time to saturate the Fortune 1,000, he conservatively expects to ship 2,500 units of each PCOX Mac product.

Initial users probably will be existing users of IBM PC PCOX products who have installed Mac IIs as alternative microcomputers, he said.

Vianet taps IBM standards

IRVINE, Calif. — Western Digital Corp. last week introduced Vianet Professional, a low-cost network operating system said to feature compatibility with IBM-standard commands and protocols as well as a menu interface.

Future support for IBM's OS/2 and AT&T's Unix System V, Release 3.0 is planned.

Western Digital, a maker of low-cost network systems and chip sets, will likely face an uphill battle for market share in an arena long dominated at the high end by Netware from Novell, Inc. in Provo, Utah, and 3+ from 3Com Corp. in Santa Clara, Calif. The most likely products to

take market share from these two heavyweights are Vines from Banyan Systems, Inc. in Westboro, Mass., and an improved IBM network operating system.

At the low end, additional competition will come from Norcross, Ga.-based Waterloo Microsystems' Waterloo Port, Torus Systems, Inc.'s Tapestry and Corvus Systems, Inc.'s PC/NOS.

Vianet Professional reportedly supports a wide range of personal computers, including IBM's Personal Computer XT and AT and compatibles as well as Personal System/2s running IBM's PC-DOS or Microsoft Corp.'s MS-DOS Version 3.10 or later. File integrity is ensured via

support for MS-DOS 3.10 record locking and extended Open commands.

Also supported are network adapter cards using industry-standard IBM Netbios protocols, including Western Digital's WD8000 and WD8003S Starlan and WD8003S Ethernet products and IBM's PC Network and Token-Ring Network adapters.

Netbios support will provide users with connectivity to IBM Systems Network Architecture-based hosts, asynchronous hosts and X.25 networks, claimed Chet Brown, vice-president of Western Digital's Communications and Subsystems Business Unit.

Priced at \$150 per node, the product will be available through Western Digital's OEM channels.

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CW 11/9

NOW THERE'S A NEW NAME ON THE BLOCK FROM THE LEADER IN DATA TRANSFER SOFTWARE...



The Systems Center put the foundation in place with Network DataMover (NDM) for MVS. It became the data transfer standard among leading corporations with multiple MVS mainframes. To top it off, now there's Network DataMover for VM.

The two products are built on a common architecture. Which gives you the ability to transfer VM files, such as CMS, into one of many MVS file formats. And vice versa. NDM also gives you complete control over MVS and VM data transfer operations through automation, security and detailed audit trails.

So whether your network includes MVS, VM or both, NDM offers a single solution. But these are just two of the NDM names on the block. There are more just around the corner...

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NETWORKING

Apollo skirts site license issue

Users 'unlock' and pay for the number of copies they need

BY JAMES CONNOLLY
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. recently claimed it has developed a means to manage and price application use on a multivendor network as an alternative to purchasing individual copies of software or site licensing arrangements.

Apollo introduced its Network License Server (NLS) for use in conjunction with its Network Computing System (NCS). The company said NLS is a combination of software locks, keys and hooks.

NLS reportedly provides the flexibility of site licensing at a lower cost while giving applications vendors a tool with which to measure application use on a network so they can charge accordingly.

Ten software vendors, including five computer-aided design manufacturers, began beta-testing NLS in October, according to Herrick Johnson, Apollo's network computing product manager. He declined to identify the vendors.

Michael Gallup, Apollo's director of product marketing, conceded that no software vendors have formally committed to NLS. However, he said he expects users to force vendors to do so. "I think what you will see is a pull-through by end users through the application suppliers. Users are going to demand it from their soft-

ware suppliers," he claimed.

Under the NLS concept, software vendors acquire a logical lock from Apollo and implement that lock on their source code. Users then buy numerical keys from the software vendor at a per-key price. The availability of those keys determines how many concurrent users can access the application from the network. Apollo, in turn, sells the NLS software, which includes a set number of hooks on which the keys are stored.

NLS currently requires an Apollo workstation to serve as a host, but it is being ported to both Digital Equipment Corp. VAX minicomputers running VMS and Ultrix and Sun Microsystems, Inc. workstations, according to Apollo.

NLS will be available on Apollo workstations in March. The basic NLS software costs \$120. A 50-hook version costs either \$4,000 for a perpetual license or \$1,000 for a one-year license. The price for the lock that vendors buy from Apollo is \$5,000.

In a related announcement, Apollo said its NCS has been ported to Cray Research, Inc. supercomputers by the San Diego Supercomputer Center and to Microsoft Corp. MS-DOS-based personal computers by Systems Guild, Inc. Apollo also announced that it has ported NCS to DEC's Ultrix, AT&T's Unix System V and Sun's SunOS.

Make Contact

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There is a world of information "out there" in dial-up public databases and non-IBM computers. Until now, however, it was impossible to reach those sources using a 3270 VM/CMS terminal.

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Reduces modem and phone expenses

Any standard dial-up (ASCII) service can be contacted from any local or remote 3270 VM/CMS terminal without the expense of installing modems and phone lines for each terminal.

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Standard

CONTINUED FROM PAGE 59

they want and refuse to settle for less.

For example: IBM recently introduced X.400 products in Europe because, it said, the market had matured enough to make it worthwhile. In plainer terms, Europeans have told IBM that it must conform to OSI protocols such as X.400 if it wants to do business with them. U.S.

users, who have no cohesive standards movement, will not see any X.400 products from IBM for a while.

Telenet, MCI and other major carriers do support X.400 in the U.S. — as a way to link up with private host-based electronic messaging systems and with European carriers. However, the carriers still refuse to link up with each other via X.400 (notable exceptions: Western Union and Dialcom). This would finally provide transparent communication

among different E-mail subscribers, as is now the case with telephone customers. But it would also, from the vendors' viewpoint, make it far too easy for customers to jump ship to another service.

Interrupted Netview

More than 25 networking vendors now support IBM's de facto network management standard, Netview/PC. But few have gotten beyond sending low-level alerts to IBM's Netview.

They seem strangely reluctant to allow IBM to control or displace their own proprietary network management systems. And IBM, despite its well-publicized eagerness to bring telecom devices under its wing, has reportedly been slow to reveal how vendors can gain more intimate access to the inner workings of its software. This leaves users with the task of developing host-based applications to manipulate the incoming data, using IBM's notoriously unfriendly C-lists.

Carriers have so far provided Integrated Services Digital Network (ISDN) services mainly as a new, more expensive transport mechanism for old-time service offerings like Centrex. The real breakthrough will be when someone — user or vendor or carrier — comes up with applications that can't run without ISDN and that users really need.

Major players like AT&T, IBM, DEC, Northern Telecom and the divested Bell operating companies are investigating market demand for various intelligent networking applications. They are also working with each other on ways to pro-

vide those services through the integration of computer and telecom equipment.

All this would be more hopeful if the various joint efforts showed signs of converging under industry standards like ISDN. But the atmosphere is more like a race to see who can come up with the most viable solutions first: Northern Telecom and DEC have produced one set of protocols for private branch exchange-to-computer communications; IBM is working on its own with various local carriers and switch vendors; and the former baby Bells are working out their own deals with equipment manufacturers.

To complicate life further, T1 switch vendors' proprietary products already provide many of the intelligent networking functions that ISDN is supposed to standardize — like intelligent rerouting and dynamic reconfiguration of bandwidth. Right now, users can only get these features by sticking with one vendor's system. But ISDN, coupled with emerging OSI network management features, promises to make those features available throughout a multivendor network of private equipment and carrier-based links, erasing T1 vendors' competitive edge.

Since the advantages of uniform communications protocols are so much clearer for users than they are for vendors, it is up to business customers to fuel standards efforts — by defining their needs and not taking no for an answer.

Horwitt is a *Computerworld* senior editor, networking.

PUBLIC NOTICE

Northern Telecom Inc. hereby gives notice that on November 2, 1987, the company announced a Volume Purchase Program for its Meridian SL-1, Lanstar PC, and Meridian Mail systems. The Volume Purchase Program offers rebates which are paid directly to the end-user by Northern Telecom Inc. based on the attainment of certain threshold levels of equipped ports (minimum 10,000) cutover between September 1, 1987 and September 1, 1988.

This program is available for cumulative new systems sales; upgrades and add-ons to existing systems are not eligible for rebates. Only system installations in the United States are eligible.

Only commercial entities and their wholly owned subsidiaries are eligible for this program. This offer is not available to federal, state or local government offices, agencies or departments. Threshold levels attained by one company cannot be combined with the thresholds of another company unless they are related entities and their common parent is the registered end-user.

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NETWORKING

NEW PRODUCTS

Local-area network hardware

The Network Printer Controller (NPC) has been announced by Xyplex, Inc.

The NPC is said to simultaneously support two parallel printers and four serial devices.

Each parallel port automatically configures itself for a Digital Equipment Corp. LP32 or Centronics Data Computer Corp. printer. Printer status can be viewed instantly on Xyplex Network Management Software.

The NPC costs \$2,575.

Xyplex, 100 Domino Drive, Concord, Mass. 01742.

Local-area network software

A software program said to connect two personal computer network operating systems has been announced by Corvus Systems, Inc.

The software, called **The Constellation-PC/NOS Connection**, is said to allow simultaneous and interactive operation of the vendor's distributed network operating system, PC/NOS, and its Constellation network software on Corvus's Omninet network.

Benefits include the ability for Omninet users using Omnidrive network

servers to upgrade to PC/NOS service capabilities and connectivity among the Microsoft Corp. MS-DOS and Apple Computer, Inc. Macintosh and Apple II environments.

The Constellation-PC/NOS Connection is licensed for an Omninet network of 64 users at a cost of \$50.

Corvus, 160 Great Oaks Blvd., San Jose, Calif. 95119. 408-281-4100.

Waterloo Microsystems Corp. has added six software products for inter-networking its Port local-area networks (LAN).

The internetworking products include two Port backbone gateways that enable one Port LAN to share file, printer, communication and mail services with other Port LANs; the Port Asynchronous Internet Gateway, which connects two or more Port LANs over dial-up telephone lines; the Port X.25 Server, which connects Port LANs to hosts or to other Port LANs via a CCITT X.25 packet-switched network; and Port Asynchronous X.25 Access software, which lets an Asynchronous Internet Gateway or remote workstation connect to a node on a packet-switched network to communicate to remote Port LANs via an X.25 Server.

The Port PC LAN program costs \$1,895. Other prices start at \$1,195.

Waterloo, Suite 200, 3597 Parkway Lane, Norcross, Ga. 30092. 404-441-9252.

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In Ohio, 513-661-6000.

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Network management

Lanscope, a local-area network (LAN) management system, has been announced by **Connect Computer Company, Inc.**

Lanscope is said to integrate network administration, network and user activity reporting, resource management, software license metering, user productivity tools and workstation menus. It is based on a universal network user, workstation inventory and resource data base and a workstation menu system.

Other features include password protection of unattended workstations, event control and scheduling of predetermined processes, network printer control and a screen saver.

Lanscope runs on Novell, Inc.'s Advanced Netware LAN operating system. A complete system costs \$1,295. An eight-user version costs \$795.

Connect, Suite 220, 9855 W. 78th St., Eden Prairie, Minn. 55344. 612-944-0181.

Customer-premise equipment

A voice-messaging system that offers modular expandability has been introduced by **Centigram Corp.**

The system, called **Voicememo II**, permits customers to start with a minimum five-hour storage time and a four-port module and to expand to a 200-hour, 120-port configuration. It is based on the



Centigram's Voicememo II

Intel Corp. 80286 microprocessor and utilizes small computer systems interface (SCSI) bus architecture. A single module measures 28 in. high by 8 in. wide by 20½ in. deep.

Features of Voicememo II include the capability to deliver unplayed messages to a subscriber at any designated telephone number; multilanguage voice prompts; variable-length security pass-codes; voice-paging support; and port use statistics.

Pricing begins at \$32,000.

Centigram, 4415 Fortran Court, San Jose, Calif. 95134. 408-942-3524.

Micom Systems, Inc. has unveiled a gateway module for use in its Instanet data private branch exchanges (PBX).

The **Model MB3I** plug-in module is said to provide access to wide-area networks and digital wideband facilities. Featurepak cartridges determine the specific gateway function provided. Access can be provided to such wide-area networks as X.25 package data networks and IBM

Systems Network Architecture/Synchronous Data Link Control and Binary Synchronous Communications networks.

It can also function as a statistical wideband multiplexer in conjunction with the Micom Box Type 3 and can be used to interconnect two Micom data PBXs using digital facilities.

The MB3I costs \$5,000.

Micom, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062. 805-583-8600.

Links

Irmacom2, a product that provides communications between IBM Personal Computers and IBM mainframes not directly attached to each other, has been

announced by **Digital Communications Associates, Inc. (DCA).**

Irmacom2 is a controller emulator featuring support for expanded memory as well as for DCA's High Level Language Application Program Interface Version 1.0 and Fortenet file-transfer software; 132-col. by 27-line screen display; and a set of optional C subroutines.

Other features include up to five concurrent host sessions; compatibility with the mainframe portion of DCA's Irmalink FT/TSO and FT/CMS and IBM's 3270 PC file transfer software; and printer emulation.

Versions for IBM's Systems Network Architecture and Binary Synchronous Communications environments cost \$895.

DCA, 1000 Alderman Drive, Alpharetta, Ga. 30201. 404-442-4000.

Courier Information Systems, an Alcatel Telic Company, has announced a **CUT-mode device adapter** for IBM 3270-compatible terminals.

The device adapter enables the attachment of up to eight IBM-compatible Category A control unit terminal (CUT)-type displays and printers to Courier's controllers. The devices, priced at \$2,495 each, can be located up to 10,000 ft from the controller.

Courier also announced dual-host capability for its 9420 remote and 9440 local IBM Systems Network Architecture controllers; RTM/Alert, which provides

Continued on page 72

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Continued from page 71

compatibility with IBM's Response Time Monitor diagnostic facility; and X.25 QLLC, IBM Qualified Logical Link Control protocol-compatible software that provides an X.25 communications interface.

Courier, 1515 W. 14th St., Tempe, Ariz. 85281. 602-894-7000.

Modems/Multiplexers

A configurable eight- to 32-port multiplexer said to combine controller ports over a single coaxial, fiber or twisted-pair cable has been announced by **Quanta Communications Systems, Inc.**

The multiplexer, called the **2600MX**, features aggregate, logic and power sup-

ply redundancy. The units can be configured in a point-to-point, multidrop or star configuration and can support one or two IBM 3270 controllers. The 2600MX can be located on the controller or terminal end via switch selection. Remote loop-back test features and individual channel diagnostics are included.

Prices range from \$2,300 to \$3,000.

Quanta, 5415 E. La Palma Ave., Anaheim, Calif. 92807. 714-970-2966.

Advanced Computer Technology has announced its **Expert** series of modems for IBM Personal Computers and compatibles.

The Hayes Microcomputer Products, Inc.-compatible modems are available in four models. The Expert 24E is an exter-

nal 2,400 bit/sec. model, and the Expert 24I is the internal version. They cost \$199 each. The Expert 12I and Expert 12E, 1,200 bit/sec. internal and external models, respectively, cost \$109 each.

Advanced Computer Technology, Worcester-Providence Tnpk., Sutton, Mass. 01527.

A digital fiber-optic multiplexer in a desktop modem configuration has been introduced by **Granger-Telettra**.

The **DTM 6F** can be mounted on a desktop or on a 19- or 23-in. rack. It was designed for short- to medium-haul low-capacity spurs and campus applications. Features include a local and remote DS1 loopback capability and a 1-to-1 protection option. According to the vendor, the

product can operate as an independent system or as part of an integrated network.

The DTM 6F can operate with transmission losses of up to 13Db. The 19-in. equipment-shelf version can be supplied with a Laser Diode option, which increases its capability to 33Db.

A basic terminal costs about \$6,500.

Granger-Telettra, 3101 Scott Blvd., Santa Clara, Calif. 95054. 408-727-3101.

The **5245** and the **5246** models have been added to **Raycom Systems, Inc.**'s 5200 series of fiber-optic channel extenders.

According to the vendor, both models provide remote diagnostic capability and redundancy. Users can place low- and medium-speed peripheral devices as far as 6,600 ft away from the IBM host computer. They connect to the CPU and peripheral devices through standard bus and tag cables.

In single-unit quantities, the Model 5245 costs \$22,000 per pair, and the Model 5246 costs \$30,000 per pair.

Raycom, 6395 Gunpark Drive, Boulder, Colo. 80303. 303-530-1620.

NEW AT COMDEX/FALL '87

Elec & Eltek Corp. announced the **Avatex 2400MNP**, an external 2,400 bit/sec. modem with error control, and the **Avatex 1200E**, a Hayes Microcomputer Products, Inc.-compatible external 1,200 bit/sec. modem.

The 2400MNP costs \$429, and the 1200E costs \$99. Elec & Eltek, Suite 310, 1230 Oakmead Pkwy, Sunnyvale, Calif. 94086. 408-732-1181.

A serial-transfer software package said to allow interoffice sharing of disk drives and printers was introduced by **Traveling Software, Inc.**

Called **Desk-Link**, the software allows users to connect any two IBM microcomputers or compatibles, including laptops, Personal System/2s and networked systems using serial ports, and up to 100 ft of RJ-11 phone wire. The product costs \$169. Traveling Software, North Creek Corporate Center, 19310 North Creek Pkwy., Bothell, Wash. 98011. 206-483-8088.

INS Corp. introduced the **INS SDLC** and **X.25** adapters for IBM Micro Channel-based microcomputers.

The adapters connect the IBM PS/2 Models 50, 60 and 80 to IBM System Network Architecture mainframes by emulating an IBM 3274 Model 51C cluster controller. IBM Synchronous Data Link Control connection is via switched or leased-line or multipoint operations; X.25 connection is by switched or leased lines over public or private networks. Each adapter costs \$995. INS, P.O. Box 91395, Mobile, Ala. 36691. 205-633-3270.

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SPOTLIGHT

APPLICATION DEVELOPMENT TOOLS



The daunting profusion of these tools and the fact that they often carry overlapping and confusing labels has hampered MIS organizations in formulating automation strategies.

A black and white photograph of a hand holding a flagpole. The hand is wearing a metal handcuff, which is attached to a chain and a large metal ring. The flag is rectangular and features the word "OPTIONS" in a bold, serif font, centered between two horizontal lines. Above the top line is a semi-circle with a star inside, and below the bottom line is another semi-circle with a star inside.

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INSIDE

High-Wire Act

Programmers at a North Carolina medical school find a tool that helps them pull off a batch-to-CICS conversion — without any background in CICS. Page S2.

Fractured Fairy Tale

Fourth-generation languages have not lived up to the prophecies. They haven't yet deposed their ancestors, and a new generation of tools is already lining up for succession. Page S10.

Finding a Common Ground

Future applications will require integrated tool sets with common architectures, syntax and interfaces. Page S12.

Vendor Viewpoint

We could build mainframe applications better if we stopped going by the old rules to select and use new tools. Page S14.

Ask the Vendor

Application-tool users ask about SQL support, source-level debugging and text handling. Page S16.

Product Chart

A detailed guide to application generators. Page S21.

Listings of change control libraries and CASE tools. Pages S20 and S28.

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Helping users adapt to technology is second nature, but MIS finds it hard to apply the same rules to its own situation.

ORDERLY PATHS TO AUTOMATION

BY VAUGHAN MERLYN



LEE COREY

Development tools have been available almost since the software industry began. Yet many of them end as "shelfware" — enthusiastically acquired and then quietly forgotten. Some are simply misused, while others linger on at great cost to the business in a sort of limbo — used on a single project but never institutionalized. Often, development automation is pursued without any strategic plan at all, and tools are approached in an almost random fashion, acquired and applied in a sort of knee-jerk reaction to clever marketing.

Each year seems to herald the promise of a new way to revolutionize software development. Fourth-generation languages, application generators and computer-aided software engineering (CASE) have all, at one time or another, been hailed as the magic potion that will help MIS managers eliminate the backlog of application requests. Meanwhile, the majority of production applications continue to be developed using third-generation languages, without the benefit of disciplined, standardized methods of managing development.

Application development has itself become a complex application — far too complex for this method of management. The MIS organization has been responsible for the transfer of applications to end users for 25 years, but so far it has done little to exploit the very technology it dispenses.

Applying technology

To better understand how the MIS function is currently becoming automated, it is useful to look back to see how computer technology has been

applied in the past to the automation of various corporate business processes. During the past quarter-century, management experienced a growth curve in which the technologies, disciplines, infrastructures and methods of automation evolved steadily and in relative synchronization with each other.

Most commonly, the automation of business functions takes place in three successive stages: operational-level automation, management-level automation and strategic-level automation.

Typically, the computerization process starts at the lower operational levels — the routine clerical processes, to which the computer is applied with the principal objective of increasing processing efficiency. Here, it is largely mechanical systems, such as payroll and order entry applications, that are the primary targets of technology. As the operational level becomes computerized, management processes, building on that base, become the next focus for automation. Payroll grows into human resource and personnel systems. Order entry leads to order processing, sales forecasting and information systems management.

Most recently, building on the operational and management-level computerization bases, the strategic level has become the focus of automation. Sometimes this evolution leads to direct

Merlyn is president of Merlyn Consulting, Inc., a Marietta, Ga.-based firm specializing in application development automation.

Automation

FROM PREVIOUS PAGE

use of computer technology by senior executives — the so-called decision support and strategic planning applications.

Of even greater importance, the focus of technology is manifesting itself in applications designed to strategically affect the business. "Strategic" and "mission-critical" applications are creating new technology-based relationships with customers and suppliers and carrying businesses into new markets with new products.

Because each stage builds on top of, and depends on, the one preceding it, skipping any stage is impossible. But most important, when businesses reach the strategic stage, the entire enterprise comes to a deeper understanding of the value of information.

Technology within MIS

This analysis of business computerization has parallels in application development automation. The tools the MIS professional first turned to were operational-level tools — production tools designed to mechanize the clerical processes of application development.

Programmers progressed from machine-level coding and card punches to high-level languages and source-input editors, test data generators and debugging aids.

More recently, these operational-level tools are being supplemented by tools aimed at the management of the development processes — that is, project management, life cycle methodologies, data administration and so on.

Now, the strategic level is being addressed. Strategic-oriented approaches, such as information engineering and strategic information planning, are receiving renewed attention as development activities are further automated. As with business automation, these approaches often lead to new relationships with the "customers" of MIS — the end users — and with the suppliers of MIS — the software houses and professional software firms.

The growth curve from operational- to strategic-level automation within business occurred during a period lasting 25 years or so.

However, MIS is being challenged to make a similar transition in much less time as it gets itself on par with the rest of the organization. MIS is suffering from future shock.

From tool to application

MIS managers must now apply internally the lessons that were learned in automating the business functions of their host companies.

For example, the MIS department advises users of the need to standardize procedures before they can be computerized. As MIS tries to computerize the processes of application development, it must also focus on standardizing the underlying processes and procedures.

As the automation of application development increases in breadth and depth, the focus must shift from tools to systems. Tools tend to support existing activities; systems, on the other hand, tend to change or replace existing activities.

In practice, the more "system-like" and comprehensive the development approach, the more care must be given to integrating the system into the application development environment.

Until a single tool set exists that can provide an integrated solution to the entire spectrum of activities and levels, multivendor, multiproduct solutions must be implemented. This means taking an architectural approach

AS THE automation of application development increases in breadth and depth, the focus must shift from tools to systems.

in which the chosen portfolio of tools operate well together, with a minimum level of redundancy or gaps in coverage.

The architecture will also guide the transition from the current tools and techniques toward the automated environment.

Set it, forget it

Where many MIS organizations go astray is in attempting to implement sophisticated application development technologies as if they were simple systems software utilities: Install the tool and then forget about it.

Unfortunately, even some vendors sell and support development automation as if it were systems software, leaving the customer to implement the product.

Compounding this problem, no significant aftermarket has yet developed to deliver the custom services that may be required by sophisticated development technology.

Sometimes the MIS organization does not have an accurate inventory of development tools that are available within the organization or guidelines on how and when these tools should be applied. Sometimes, no goals for automation have been defined and communicated.

Frequently, the development tool lacks defined, measurable

Continued on next page

Shifting to CICS without a net

BY BECKY BATCHA

With the aid of a development tool that generates on-line IBM CICS screens, the small programming staff at Wake Forest University's Bowman Gray School of Medicine in Winston-Salem, N.C., recently pulled off a feat of DP bravado. Programmers carried out a conversion from batch processing to an on-line CICS environment without bothering to learn CICS techniques along the way.

According to Bob Peddycord, manager of computer systems development, the school made quite a leap when it switched from a pure batch environment on a Honeywell, Inc. 6620 mainframe to a CICS environment on an IBM 3081 Model K.

"Coming into IBM was a different world because it was on-line, and a lot of us didn't have any experience [with that]," Peddycord says. "None of us had CICS experience."

The conversion was a complicated affair. Peddycord and his programming staff of five needed not only to port existing administrative applications from the Honeywell mainframe to the IBM machine but also had to bring up a complete set of packaged financial software on the new host. The conversion was the staff's first experience with packaged software, and the project's two lead programmers had just joined Bowman Gray.

With a little help

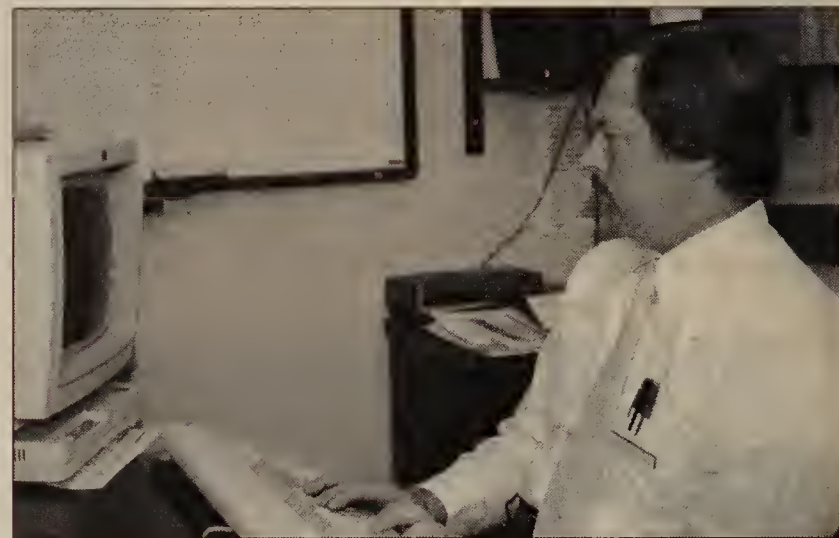
To help ease the transition, Peddycord and his staff chose to buy packaged financial software from a vendor that offered an integrated applications development tool as well. In June 1985, they chose McCormack & Dodge Corp.'s Millennium financial series and Millennium Systems Development Tool (SDT).

SDT's screen-generation facility proved especially valuable, Peddycord says. With it, his staff has been able to perform three tasks vital to the school's conversion: writing on-line screens for existing administrative batch applications, customizing Millennium financial modules and building new on-line administrative applications — all without writing any CICS code. "It saved us a great deal of time that we would have had to spend learning to program CICS," he says.

Bowman Gray began moving its administrative and financial processing from one host to the other right after it signed on

with M&D in the summer of 1985. Peddycord says he expects to be completely off the Honeywell machine within a month or so.

The school has used Millennium SDT to convert two important batch applications: a budgeting system and a telephone tracking application. Data and reporting structures for the two programs remained intact. After performing a simple conversion from Honeywell Cobol to IBM



Bowman Gray's Peddycord

EILEEN GIULIANO KERR

Cobol, Peddycord's programmers merely used the development tool to graft on-line screens onto batch applications.

In sessions with end users, programmers developed prototype screens, laying them out to accommodate the data that users would need to enter. That done, they excused the users and put SDT to work building code.

"Once you have the screen laid out, it takes a matter of hours to generate one," Peddycord says.

With new screens lying on top of the old applications, users in the budget and communications departments can update their files through on-line sessions with the host. The communications department, for example, can change its file of telephone extensions so that the system generates accurate, up-to-date chargeback statements for the school's various departments.

Customized with screens

Bowman Gray's programmers have also used Millennium SDT to customize the standard Millennium general ledger, payroll, accounts payable and purchasing modules that the school bought for the 3081. Peddycord and his staff modified on-line screens and wrote behind-the-scenes program calls that pull data from the screens and manipulate it as needed.

They programmed the pay-

roll system, for example, to check the general ledger master file to make sure an employee has a valid account before creating a payroll distribution file for that employee.

The programmers needed no CICS expertise to write the program calls, Peddycord says. All background programming can be done either in standard Cobol or in M&D's high-level Procedural Definition Language (PDL). Peddycord says PDL resembles PL/I and Basic and was easy for his staff to learn.

Programmers found that they could build statements more quickly with PDL than with Cobol. However, they used Cobol to code all their complex procedures, Peddycord says, because it runs more efficiently. For example, an on-line application that had been developed in PDL ran

twice as fast after it had been rewritten in Cobol.

Besides modifying batch applications and the financial modules, staff members have built one system from scratch and are working on another. Their first custom application for the 3081 is a space inventory system, a data base that keeps track of some 5,000 rooms at Bowman Gray and its affiliated teaching hospital, North Carolina Baptist.

Working in Millennium SDT, Peddycord developed the application's four data screens and associated background edits in just 30 hours, which impressed even him. "I don't have CICS experience, but I have worked with other equipment where you had to do your own on-line screens," he says. "With SDT, it took about a third of the time."

Bowman Gray's second custom SDT application for the IBM mainframe is another data base system. This one will log in new equipment that the school and hospital acquires and will track existing equipment as it moves from room to room.

Although the school's programmers have made great strides without any knowledge of CICS, Peddycord says his shop cannot stay in the dark much longer. Two of the school's five programmers are taking classes in CICS. "We need to know a little bit about it, just to know what's going on," he says. •

Batcha is a free-lance writer based in Boston.

Automation

FROM PREVIOUS PAGE

objectives, so it is impossible to identify whether it is being effective and is achieving its desired results. Given the usual trade-offs in development automation, this lack of objectives can lead to a potentially important tool being discarded, simply because the extra hardware overhead it entails was not factored into capacity planning.

Price of productivity

For all of its benefits, accelerated application development sometimes comes with a price tag attached to it.

Some operational efficiency is usually given up for significantly improved development productivity.

Unfortunately, while financial management has been good at measuring the costs of operating applications, MIS management has paid little attention to mea-

MANAGING organizational change is the "high-touch" counterbalance to the high-tech of application development automation.

asuring the key indicators of application development, maintenance and end-user productivity. Metrics commonly applied in the industry have been more concerned with efficiency than effectiveness.

Revising old crafts

A critical and complex relationship exists between application development methodology and technology. Most development methodologies in use today evolved from manual development approaches.

As automation is introduced, old methods must be revised to accommodate the new technologies, standards and characteristics. This overhaul of procedure requires careful management attention so that uniform, consistent methods become institutionalized.

As software crafting gradually assumes engineering qualities, it becomes increasingly important to address the issues of metrics and instrumentation. Identifying and then agreeing on the basic measures of software delivery are essential to improving these processes. Measuring productivity and quality on a continuous basis are critical challenges that MIS must address to effectively automate software development.

Craftsmanship facilitates individual product variations that,

once automated methods are implemented, cannot always be met. MIS has so far enjoyed the luxury — thanks to the skills of third-generation language programmers — of being able to implement virtually any application architecture and characteristics it wishes.

There has been ultimate flexibility in the choice of human interface, for example. In fact,

some would say this flexibility has exacted a hefty price in end-user productivity lost in the multiplicity of application idiosyncrasies.

Velvet glove approach

MIS management consistently underestimates the challenge of institutionalizing new approaches to systems development, erroneously assuming advanced

technology will be hungrily embraced by the development community.

In some respects — and borrowing from author John Naisbitt — managing organizational change is the "high-touch" counterbalance to the high-tech of application development automation.

Unfortunately, technologists tend to focus on the high-tech

and are rather unskilled in the high-touch.

Introducing application development automation into an MIS organization significantly affects that organization and sometimes has a shattering effect on the individuals within it.

Highly skilled programmers, for example, may feel threatened by the need to learn

Continued on page S6

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Automation

FROM PAGE S3

something new, particularly if they believe the new technologies may erode the need for their special skills.

Cultural and organizational change must be structured and managed. Human skills and disciplines must be applied so the nature of resistance and its potential manifestations can be determined and appropriately handled.

The end user of an application must be considered more intimately during the application development process. The end user is a critical part of the application and should be closely involved in its definition and development.

While modern application development approaches facilitate an enhanced end-user role, some MIS organizations fail to exploit this opportunity, and the hooks originally designed with the intent to allow end users to participate ultimately become the holes in the development infrastructure.

Do-it-yourself development

Leaving end users out of the formal application development process is no solution.

In fact, the confusion of software development automation has been compounded by end users taking responsibility for satisfying their own requirements.

There are currently two application delivery centers: the professional MIS application development group and end users. The end-user "center" is, of course, distributed and heterogeneous.

Author Alvin Toffler, in his book *The Third Wave*, describes how technology spreads from different centers at different rates. This wave theory is very illuminating when applied to software development automation.

The waves of change for the MIS professional and those for the end user are not governed by the same forces, and are, therefore, at risk of meeting head-on in a collision that would obstruct productivity and end in confusion.

Technology horror stories

In analyzing the faltering progress of development automation, remember also that technology itself is not entirely immune to problems.

Early application generators sometimes created maintenance problems that more than offset their advantages. From fourth-generation language lore arise horror stories in which the tools were misapplied, leading to unaccepted application performance.

Some of the personal computer-based products lacked adequate work-group support facilities, limiting their use in large projects. Some CASE products, for example, suffered from the limitations of

current workstation platforms — limitations currently being mended but, nonetheless, that have a sometimes severe impact.

Many advanced application development approaches unexpectedly affect the design characteristics of the final application. Indeed, if the application generator in question exploits reusable code concepts, the effective use of that generator may be felt only by accepting certain application design standards. If the restrictions and impact on the target application are not anticipated or are inadequately accommodated, long-term productivity and application quality can fail dramatically.

MIS Tower of Babel

Since development tools are not categorized

according to any commonly accepted standards or definitions, MIS managers experience difficulty understanding what vendors and other MIS professionals mean when they use certain terms. Terms such as "fourth-generation language," and "CASE" are simply marketing labels — they convey no common meaning.

CASE, for example, has its origins in the engineering world, in which computer-aided design and manufacturing are graphically oriented tools supporting rigorous engineering disciplines.

When applied to software tools, CASE was first used to describe workstation-based graphics tools that support struc-

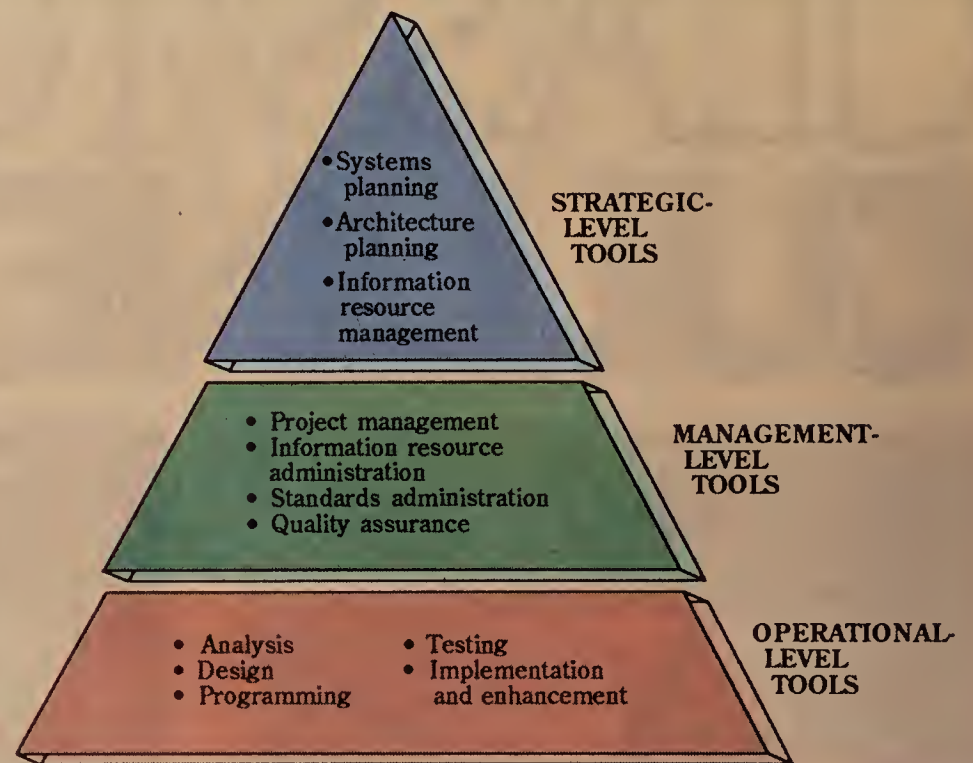
tured analysis and design. However, the term is now more broadly applied and refers to virtually any type of development tool.

Although their sales forces may leave a different kind of impression, vendors of CASE products would largely like to see the term reserved for approaches supporting the transition from software crafting to disciplined engineering methods.

It is possible to bring some sense to the plethora of development tools by creating a taxonomy based on typical ascending layers of technology. Gary Lansman, senior project manager at Bank of America in Concord, Calif., describes such a "Systems Development Tools Portfolio" paradigm, which identifies tools intended to support the operational, management and strategic levels of the typical MIS organization (see chart above, right).

System development portfolio

Tools for each level of application development automation



CW CHART: MITCHELL J. HAYES

Using Lansman's paradigm, we can describe some of the kinds of tools that are found in each level.

Operational-level tools

Operational-level tools can be described according to the major life cycle phases that occur in systems development, as follows:

Analysis. Tools targeted at supporting the systems analysis processes include the graphics-oriented workstation-based products such as Index Technology Corp.'s Excelsior and McDonnell Douglas Corp.'s Prokit Workbench.

Typically, these products provide graphic editors as well as dictionaries to support activities such as process and data flow decomposition and data structure analysis.

Design. Tools such as Nastec Corp.'s Designaid and Ken Orr & Associates, Inc.'s Designmachine support software design activities. Like analysis products, these tools offer graphics editors oriented to such design activities as module decomposition and data structure design.

In practice, there tends to be an overlap between analysis and design, and graphics-based tools typically support both, as well as the transition between these phases.

Programming. Various approaches have been applied to automate programming activities. Some products ease the programming burden by replacing third-generation languages such as Cobol with higher level languages — that is, languages with higher level constructs and built-in functions.

Products such as Applied Data Research, Inc.'s Ideal, Software AG of North America, Inc.'s Natural2 and IBM's Cross System Product can replace Cobol for most types of applications in existence today, from simple batch programs to sophisticated on-line transaction processing applications.

Some products help programmers organize their work and reuse standard

code modules, usually written in Cobol. Examples of these include Netron, Inc.'s CAP Development Center and Manager Software Products, Inc.'s Sourceman-ager Version 2.0.

Other products bring more automation to the programming task by generating third-generation language programs — typically into Cobol — from very high-level specifications.

Products such as Telon from Pansophic Systems, Inc., Transform from Transform Logic Corp., Magec from Al Lee & Associates, Inc. and Pacbase from CGI Systems, Inc. are examples of such application generators.

Still another group of products pursues a somewhat more evolutionary approach, focusing on environmental improvement for the programmer rather than bringing dramatic change to the programming processes. Products such as Micro Focus, Inc.'s VS Cobol Workbench and Realia, Inc.'s Cobol exploit the interactive responsiveness of the PC as a workstation environment for Cobol programming activities, even when the end result will be a mainframe Cobol application.

Testing. Tools intended to support the testing phases of application development have been an important element in the systems software landscape for many years.

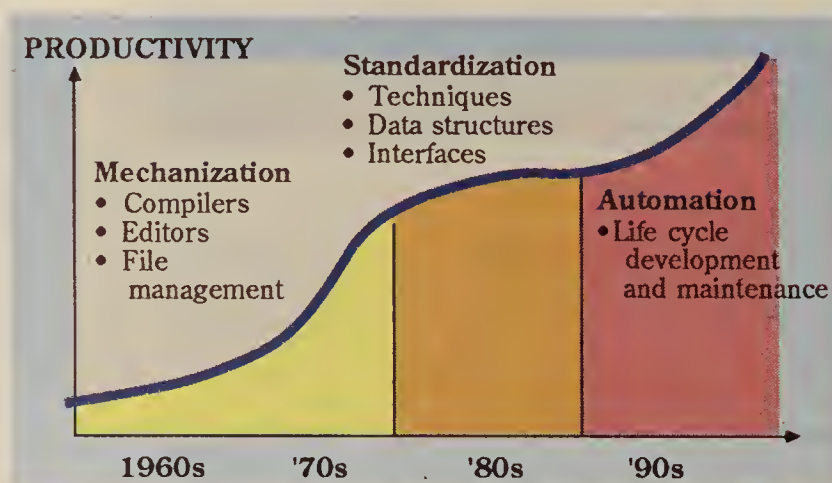
Products such as On-Line Software International, Inc.'s Intertest, Compuware Corp.'s Abend-Aid and Aldon Computer Group's Analyzer help to increase the productivity and quality of systems testing activities.

Implementation and enhancement. Research indicates that more resources are consumed by an application after the programming and testing have been completed than are consumed by all the phases leading to systems implementation. Surprisingly, only recently have tools intended to support application implementation, management and maintenance surfaced in any number.

Some products help track change requests and the multiple versions of software and documentation through which an application passes during the many stages involved in its metamorphosis. Products such as Change & Configuration Control from Softool Corp. and Library Control System/Change Management

Stages of application development automation

Time frame and productivity yield for each stage



Facility from Pansophic, for example, assist in change management and version control.

Other products tackle direct maintenance activities, either by assisting in code analysis or automating code restructuring. Viasoft, Inc.'s Via/Insight and Language Technology, Inc.'s Recoder are examples of products that support maintenance.

Management-level tools

Project management tools are increasingly an important part of the software development automation portfolio.

Whether workstation-based, like Applied Business Technology Corp.'s Project Manager Workbench, or mainframe-based, such as Projon from Resource Control Systems, Inc., these tools assist in the myriad of interrelated resource planning and control activities typically associated with a complex software development project.

IN THE absence of fully integrated CASE products, MIS is becoming its own systems integrator. However, the lack of standards and common interfaces among the different tools and components is frustrating.

Information resource administration. High-level tools intended for assisting information resource administration have appeared recently, their use often catalyzed by a move to relational database management systems. Products such as D. Appleton Co.'s Janus and Technology Information Products Corp.'s TIP/Create support strategic information resource planning and administration.

Standards administration. Tools to support the administration of standards have been an important part of the U.S. Department of Defense, aerospace and government sectors of the software industry. In these markets, government and military specifications demand special standards and requirements for contractors to follow. Vendors such as Metasystems, Inc. and Promod, Inc. provide products that support standards administration.

It is likely, as the state of the art of systems engineering matures, that some of the tools and experience from the aerospace and defense sectors will find their way into commercial ones.

Quality assurance. Quality control and assurance are becoming important elements in many CASE approaches, in which rigor and the ability to validate and cross-reference diagrams can significantly aid in checking and verifying the quality of development products. As productivity improvement becomes more of a quality control issue than one of simple productivity, techniques for early defect detection and prevention will become increasingly important.

Strategic-level tools

Strategic-level tools can be categorized by the major strategic planning activities. Product examples are somewhat sparse in this segment because of the technology's relative immaturity.

However, many more strategic planning products for MIS are expected in the next couple of years.

Systems planning. Systems planning is currently being recognized as an important element in improving MIS effectiveness. The move toward leveraging technology for strategic advantage requires a more rational approach to systems planning than has been commonly practiced.

Holland Systems Corp.'s Strategic Systems Planning and Arthur Young's Strategic Information Systems Planning are methodologies that support the strategic planning activities.

Architecture planning. As technology decentralizes from mainframe-based systems toward cooperative processing

networks of personal workstations, departmental processors and enterprise mainframes, architecture planning takes on new significance in the portfolio of planning tools. D. Appleton's Leverage and Manager Software Products' Methodmanager are examples of products designed to define and integrate information architectures.

Information resource management. MIS organizations, even in industries that are experiencing dramatic changes, are discovering that a properly defined information resource tends to remain fairly stable. Exploiting this stability requires an "asset management" approach be taken to the management of information resource.

Examples of products that flesh out

this category include D. Appleton's Requirements Analysis Planning and TIP/Define, a product from Technology Information Products.

As the level of attention to strategic MIS planning increases, many more products and methodologies will be introduced, some as discrete offerings, others as components of integrated CASE approaches.

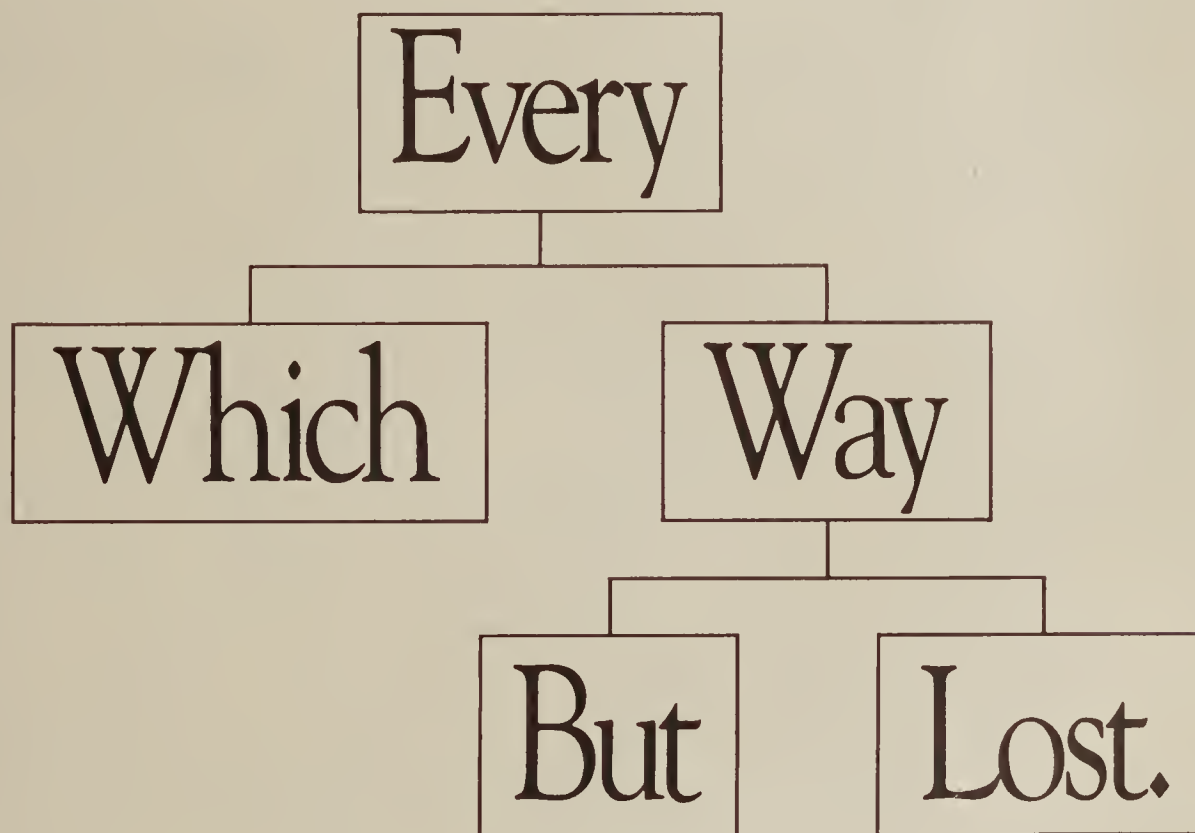
Shaping tomorrow's strategies

An examination of development tools during the last decade reveals important trends that are expected to shape tomorrow's vendor strategies, products and related services.

One is the necessity of passing through a standardization phase as part of the

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transit from mechanization to automation. Technology often tends to limp along at a slow place until standards emerge, at which point great progress is made.

In the absence of fully integrated CASE products, MIS organizations are starting to become their own systems integrators, building their own workbenches and development environments from other tools. However, the lack of standards and available interfaces among the different tools and components often tends to become frustrating.

Before full bloom

The fact that we are currently in the early stages of standardization — a period that necessarily must precede the full bloom of

A DECISION must be made as to how rapidly the transition to automation will progress. There are extremes in revolution and evolution. In the former, the entire automation-level pyramid is tackled in a single undertaking. In the latter, it is addressed one piece at a time.

automation — explains the recent interest in SQL, a standard data management language, as well as IBM's promised Systems Application Architecture and the many other standards that are beginning to emerge.

Another important trend can be seen in the increasing automation of the development life cycle phases. Initially, opera-

tional-level development tools focused almost exclusively on the physical programming phase.

Early on, this programming support was accomplished in the form of on-line source code editors — that is, word processing applied to programming.

Gradually, the programming task was attacked more directly with higher level

programming approaches, including fourth-generation languages and application development systems.

Although the term "integration" is greatly overused, it has, in fact, been developing between development phases (horizontal integration) and across operational, managerial and strategic levels (vertical integration).

Pushing ahead

Aspects of application development are increasingly off-loaded from the mainframe to workstations. As application development technology has moved from simple "mechanization" to fuller "automation" and as it has become increasingly dependent on graphical human interfaces rather than simple text, the demands for processor cycles and decisecond response time become significant.

Workstation technology is frequently an important element in providing this local horsepower and interactive graphic environment cost-effectively.

Initially, a classic PC approach was taken, with stand-alone PC-based tools. These products are gradually growing into true workstation environments, cooperatively processing with the mainframe (or minicomputer) and often supporting local-area networks.

For most enterprises, software development has become the primary bottleneck inhibiting the effective use of information technology. Nevertheless, good news is being heralded: The development productivity market is expanding rapidly, and a convergence of technologies and methodologies promises significant relief in the near term.

However, with this field evolving so quickly, MIS management must apply to itself the lessons learned from automating the business. An automation framework must be defined and an architectural approach taken to automate the development application. The process must be treated like any other complex, major application project; except for this project, the end users happen to be MIS professionals — which makes for a difficult target.

You say you want a revolution?

Management must understand just where it stands in the transition — from mechanization through standardization to automation of the application delivery process.

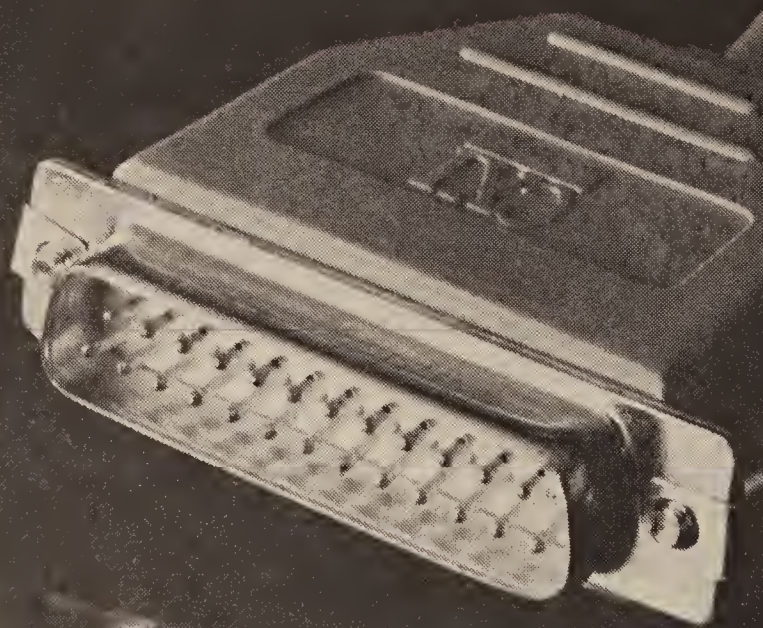
At some point, the decision must be made as to how rapidly the transition will progress. There are extremes in revolution and evolution. In the former, the entire automation-level pyramid is tackled in a single, bold undertaking. In the latter, the pyramid is addressed in stages, one piece at a time.

There are, of course, many shades in between. The degree of revolution and its impact should be considered, as well as the organization's capacity to handle that revolution.

Above all, management must be sensitive to the hype surrounding the development tools market. As vendors try to be noticed and taken seriously in this growing marketplace, their enthusiasm can sometimes create false or unrealistic expectations.

Management is still responsible for figuring out how to put all the pieces together and how to make them work within the human system — which is ultimately the one that delivers information solutions to end users. •

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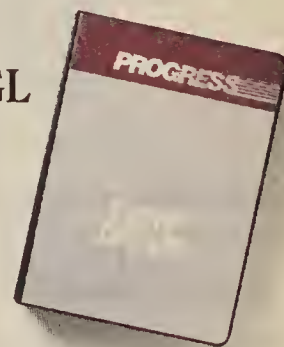
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Fourth-generation languages: The promise and the reality

BY MICHAEL SULLIVAN-TRAINOR

Once upon a time, there was a magic application development environment called fourth-generation languages. They were said to be faster, more accurate and easier to use than Cobol. Storytellers foretold the replacement of third-generation application development with these wonder tools.

Unlike the fairy-tale version, the reality of fourth-generation languages is far below expectations. Cobol is still the predominant language for business production applications, and the fourth-generation tools are fac-

ing an onslaught of new techniques and technologies that challenge them as the most efficient ways to develop applications.

"MIS directors understand that Cobol will not meet all their needs," says Bruce Sherman, an independent consultant in Minneapolis. "But when the applications are vital to the company, they will lean toward Cobol."

User categories

The best-known fourth-generation languages are those offered by the independent data base management system vendors as part of their DBMS environments.

Traditionally, these products are divided into two categories: production products — such as Applied Data Research, Inc.'s (ADR) Ideal, Software AG of North America, Inc.'s Natural, Cincom Systems, Inc.'s Mantis and MAI Basic Four, Inc.'s ADS — that are used for business applications developed by computer professionals and, two, information center products — such as Information Builders, Inc.'s Focus and Software International Corp.'s Ramis — that are used by end users.

Chief among the advantages these languages offer is their relationship to a specific DBMS and data dictionary. "They offer tight couplers between the fourth-generation language and the data base environment," according to Peter Burris, a software analyst at International Data Corp. (IDC) in Framingham, Mass.

On the downside, many of these languages do not measure up to either vendor claims or academic ideals. They may speed application building, but not at the rate claimed by vendors.

Productivity savings occur only during actual coding, and that is only 35% of the development process, explains Shaku Atre, president of Atre International Consulting, Inc. in Rye, N.Y. "Even during coding, the savings is not 10 times faster than Cobol but only two or three times," she says.

Answering the claim that fourth-generation languages are more accurate than Cobol, Atre contends the languages produce fewer errors because there is less code to write — one statement for every 10 Cobol statements, for example.

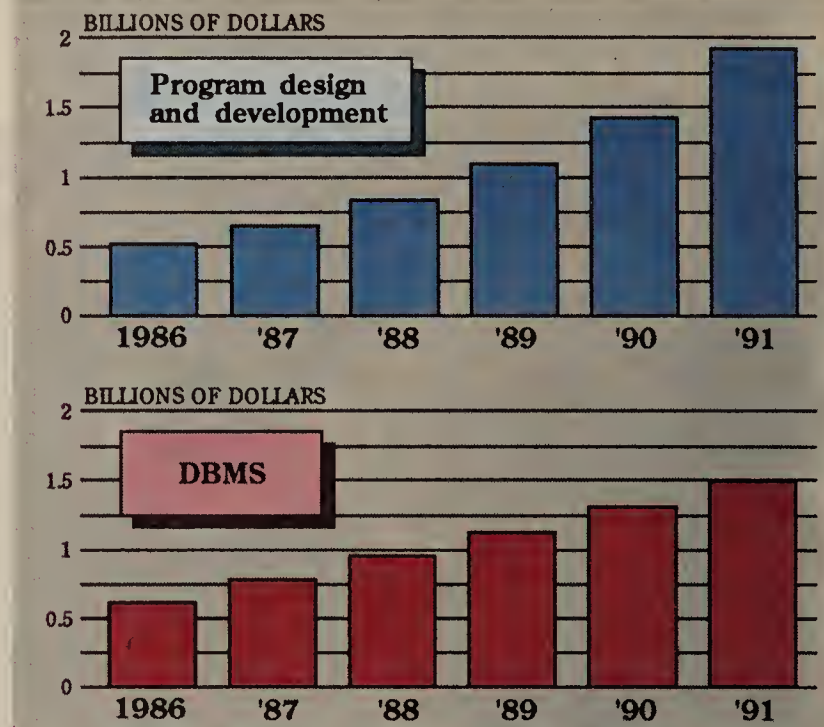
But often, the languages are turned over to Cobol programmers, who waste code developing applications in the style to which they are accustomed.

Finally, fourth-generation languages have more of a learning curve than most purchasers expect. These languages do not require extensive programming classes, such as those for Cobol, but, in many cases, they do require users to learn new syntax.

The fourth-generation languages are also haunted by a bad reputation for using up more CPU cycles than Cobol. What lies behind this criticism is the

Comparative revenue growth for DBMS and program design and development software

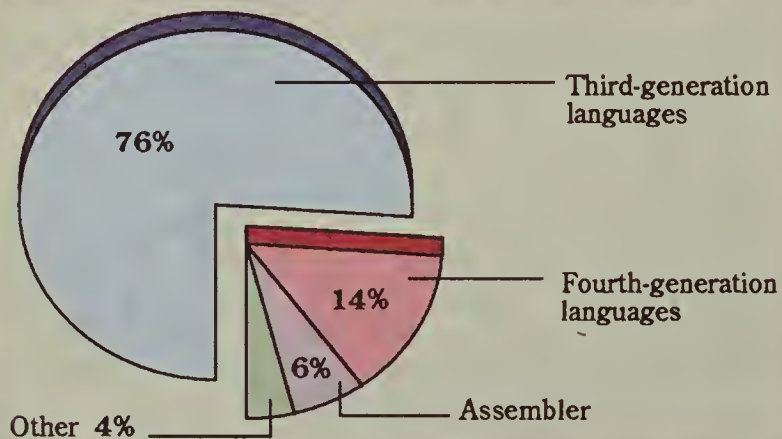
Actual and projected worldwide revenues for U.S. vendors, 1986 to 1991



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. CW CHART

Language utilization for application development

Third-generation languages still predominate for IBM mainframes



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. CW CHART

fact that they are interpretive, which in the past meant they were not compiled. However, vendors are now offering the languages with compile capabilities to improve efficiency.

"Now you can invest in compile time once, so at execution time you save through better performance," says Charles Bachman, president and chief executive officer of Bachman Information Systems, Inc., a Cam-

bridge, Mass.-based software company. if they did not extend their programming staff from its present number, they would be devoting 100% of their resources to maintenance by 1991," Bachman explains, referring to Aetna Casualty & Surety Co. in New York.

Application generators, such as Pansophic Systems, Inc.'s Telon, are used to develop generic production applications.

"If I'm looking at an on-line production application that will be around for 20 years, I want to develop it in a language everyone understands, and I'll use an application generator," Sherman says. "If it's a quick ad hoc report that we need — a one-shot deal — I'll use a fourth-generation language."

CASE products, such as Bachman's Data Analyst line —

which is currently being alpha-tested — are born of fifth-generation technology that uses an expert system to automate the application development function. This can be applied to the maintenance of Cobol applications as well as the creation of new ones.

'Reverse engineering'

"We go through a reverse engineering process to lift the Cobol programs and data descriptions to a higher level of abstraction, where you don't see what people have done to optimize the system," Bachman says.

Bachman's Intel Corp. 80386-based workstation products allow users to modify high-level language descriptions of the original program and then translate them back to their

Continued on page S15

BEFORE, customers would choose the data base technology, and the DBMS was made more attractive by elegant and graceful applications tools. Now, the focus has changed to developing applications."

PETER BURRIS
INTERNATIONAL DATA CORP.

bridge, Mass.-based software company.

Apart from these issues, the value of fourth-generation languages as an alternative to Cobol is being challenged by the sheer volume of Cobol applications already in place.

It is also finding a match in other development tools, such as application generators, that speed the Cobol development process and by computer-aided software engineering (CASE) products that automate the enhancement and maintenance of those applications.

"People are mostly enhancing, migrating and maintaining existing applications," Bachman says. Up to 80% of programming resources are devoted to maintenance rather than to new applications, he adds.

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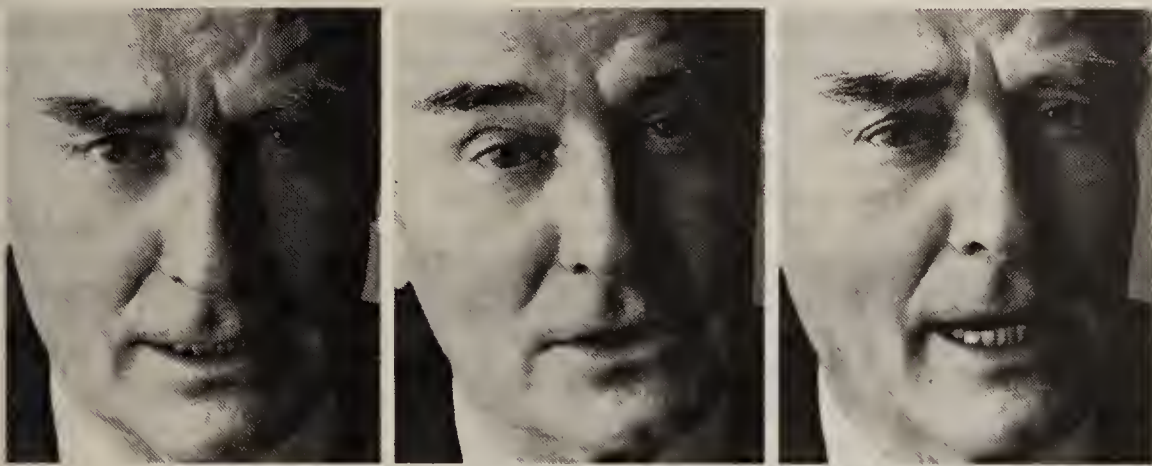
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Development overload creates tool pollution

BY PER FLAATTEN

The abundance of application development tools that exists in today's market is a sign of health for the data processing industry and a herald of good news for application-hungry information systems developers.

A surfeit can bring problems, however; the swelling supply of products makes it

difficult to select a single tool, implement it, integrate it with other tools and train developers to use it properly.

Instead, developers end up buying different tools that more or less perform the same task.

In addition, few developers in an organization adhere wholeheartedly to a new

tool; yet once converted, they often insist on using that same tool after it becomes obsolete. In short, application development is starting to suffer from tool pollution.

Generation gap

Like hardware, application development software tools have evolved in generations:

- First generation: Assemblers.
- Second generation: Compilers, operating systems and utilities.
- Third generation: Data base management systems, transaction monitors, on-line program editors, report writers and screen painters.
- Fourth generation: Program and application generators, computer-aided soft

ware engineering (CASE) tools, personal computer-based tools and end-user computing tools.

The rapid pace of technological change does not give tools time to mature before the applications they were designed to advance have been extensively implemented.

For example, compilers, which are second-generation productivity tools, matured in the early 1970s; but that was a time when most system developers were already thinking about data base and on-line processing technology, both of which are third-generation applications.

Now, data base and data communications tools are maturing, when most installations have already implemented on-line transaction processing against production data bases, and most of the industry's developers are busily planning distributed processing and decision support systems.

New tools hatch

Based on this analysis, it is easy to predict that as the current, fourth-generation tools reach their maturity, a fifth genera

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(more or less)

FEW DEVELOPERS within an organization adhere wholeheartedly to a new tool; yet once converted, they often insist on using that same tool after it becomes obsolete.

tion will emerge. The challenge is to predict what type of tools will make up this generation.

One method of divining the future is to study technological innovations and speculate on how they might be applied. A more fruitful method would be to examine where system developers want to go and deduce what tools are needed to help them get there.

The first approach lets us guess what tools might be invented; the second allows us to predict the types of tools that will be of lasting value.

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used to increase their competitive advantage, either through differentiation or by reducing costs.

Consequently, businesses will continue to explore and develop the innovative applications that will be necessary to achieve those goals.

Driving the market

This search for innovation is what will drive the application development tool market.

Skyrocketing costs can often be reduced, and competitors shut out of the market, by eliminating a company's intermediaries such as the data entry clerks and reaching out directly to all of the corporation's end users.

Not only are the systems being extended to new users who are already inside the organization — the financial analysts, engineers, architects, lawyers, librarians and, on occasion, to top management itself — but also to the company's customers and suppliers. This implies an increase in the role of data

IF WE do not insist on standards today, we will face tomorrow an ever increasing number of tools that are slightly different that will also use slightly different approaches. This may preclude needed innovations.

communications and connectivity across systems. The tools required to achieve communication between heterogeneous environments and enable management to control that communication will be required.

Supporting the demand

With the increasing use of computers in the general population, the demands that are placed on the human interface facilities — bit-mapped terminal management, windowing, on-line Help and user friendliness — will greatly increase. Development tools must support the creation of applications that reflect these demands.

The pursuit of differentiation, meanwhile, leads to systems that are ever more ambitious and, therefore, ever more complex.

Although system development productivity has increased at a good rate during the past 35 years, it has not kept pace with demand.

The increase in productivity has been, and will continue to be, absorbed by ever larger projects. Even if new tools could multiply programmer productivity by a factor of 10, enough identified applications would still exist to keep us going for years.

Obviously, we will not achieve an increase in productivity of any order of magnitude overnight.

The new tools that have been developed to exploit techniques such as expert systems and object orientation will certainly help improve productivity, but these tools will not put programmers and developers out in the cold on the unemployment line.

Finally, there is the issue of maintenance. Most people think of applications as short-lived. But it is not uncommon to

WITH THE increasing use of computers in the general population, the demands placed on human interface facilities — bit-mapped terminal management, windowing, on-line Help, user friendliness — will greatly increase. Development tools must support the creation of applications that reflect these demands.

see systems in place after 18 to 20 years of use.

There are far too few maintenance tools available that can optimally maintain today's applications. In the longer term, applications developers will need tools and techniques that are radically different in order to help create applications that

will be robust enough to last a lifetime.

Groundwork for the future can be laid with standards for the current generation of tools. Some progress in this area has already been achieved: The standardization of IBM's Structured Query Language, the effort to create portable tool sets for the Ada and Unix environments, the Open

Systems Interconnect model for data communications and efforts toward common windowing products are all steps in the right direction.

If we do not insist on standards today, we will face tomorrow an ever increasing number of tools that are slightly different that will also use slightly different approaches. This may preclude needed innovations.

Only by agreeing on common industry architectures, syntax and interfaces will we be able to construct the next generation of integrated tool sets — tool sets that will enable us to build tomorrow's applications. •

Flaatten is manager of industry intelligence with Arthur Andersen & Co. in Chicago.



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VENDOR VIEWPOINT

Still complex after all these years

BY BRUCE MANCINELLI



Despite fourth-generation technology and years of talk about user friendliness and on-line interactivity, developers still deliver mainframe user applications that are flat, colorless and complex.

They do deliver their systems faster than they used to, thanks to the coding productivity gains achieved with fourth-generation languages. However, designers still build layer upon layer of complicated and cumbersome screens, without any logical pathing or discernible organization. Applications look different and run differently from one vendor's workstation to another's.

There are reasons for this backwardness at the mainframe level. First of all, development is sorely lacking in data presentation techniques or technologies for mainframes. Then too, many fourth-generation systems are still so dependent on specific data bases, teleprocessing systems or operating systems that the restrictions and nuances of each become an

A GOOD fourth-generation strategy is one that eliminates the substantial differences that exist among mainframe operating environments.

integral part of what gets delivered.

But the types of applications delivered must change, and to accomplish this, it is necessary to select application development facilities that promote and support new capabilities and provide better insulation from operating environments.

A consistent application development strategy can provide the basis for vertically integrated applications capable of operating on a range of computers. This criterion, more than any other, is too often overlooked in selecting a fourth-generation language and is one of the major reasons that nonportable systems and device-dependent, "user-hostile" applications are delivered to users.

A good fourth-generation strategy is one that eliminates the substantial differences that exist among mainframe operating environments. An application should be developed to work consistently across processor tiers, transcending the singularities of each machine architecture, operating system, teleprocessing monitor, network, data base architecture or access method. Whether an application is developed for on-line or batch processing should not matter.

Sizing up 4GLs

The fourth-generation language selected should be tightly and actively integrated with the application development process, and user interaction should be integrated with the delivered applications.

Personal computer data interchange commands should be a part of the fourth-generation facility, as should integrated support for graphics and text.

It is not enough to produce applications that unite corporate data and user files; they must also provide a wide range of presentation styles to enhance user understanding and use.

Relying on their knowledge base of

older third-generation technologies, users too often concentrate on evaluating and selecting application development software that mirrors the facilities of old development languages and introduces few new capabilities.

Selecting a new language as capable as Cobol — that is able to perform at processing levels equal to or exceeding that of Cobol — is crucial. But the fourth-gen-

eration language should also introduce new capabilities that promote and assist in creating fourth-generation applications.

A fourth-generation language should not require knowledge of physical data structures and should be able to support a wide range of access types and data bases. The effective use of SQL, both dynamically created and supported with static SQL source statements, should also be provided. Fourth-generation applications should be able to interact with all data bases and files without depending on application code.

The effective use of window managers is standard with microcomputer software solutions. In fact, the ability to present information to a workstation through active

VaporCASE

VaporCASE

The wishful promises of vendors who are trying to jump on the CASE bandwagon. They demonstrate part of the CASE solution, and hope you'll wait until they develop the rest of their system which they promise will be ready "any day now." Meanwhile, even if they could help you develop a brilliant applications strategy, you have no clear way to implement it.



Piece Parts



Some CASE suppliers offer a small piece or two of the puzzle. A front-end here. A back-end there. Integration? No problem! Just as soon as they can make Company A's front-end work with Company B's repository, and tie everything into Company C's code generators.

Projections

One way to evaluate a CASE system is to simply visit the installations where the product is up and running. Most CASE vendors will tell you where their product might be installed in the future...if you don't mind waiting.



windows has contributed greatly to the acceptance of many PC tools in the user community. Mainframe fourth-generation languages should provide similar capabilities.

Screens and windows of any size should be easily created. Screens should utilize color and provide extended attribute support.

Active tiled and overlapping window support should be provided. One active window should be able to populate another window without having to leave the presentation area.

Physical management of windows should be an inherent part of the fourth-generation language facilities and should not require coding logic to support it.

Large presentation areas and arrays

THE DAYS should be over when professional programmers choose what systems to develop even when they may not satisfy end users. Neither should a system cater solely to end users' needs.

should be supported without regard to physical device characteristics, and left and right, forward and backward scrolling ought to be automatically managed by the fourth-generation language.

All presentation areas in all windows should be field- and cursor-sensitive to allow the multiple windows to interact and support the application.

Does a data dictionary, as opposed to

program code, provide all the support for editing, data formats, validation processing and information processing rules? Such support, inherent in a data dictionary, needs to be a part of the delivered application. The most advanced fourth-generation language facilities now available provide such a capability.

It is possible for fourth-generation languages to satisfy the requirements of both

the professional programmer and the end user.

In the future, that satisfaction should be the standard against which any such product is measured. The current separation between professional and end-user fourth-generation languages is unnecessary and counterproductive.

The days should be over when professional programmers choose what systems to develop even when they may not satisfy end users. Neither should a system cater solely to end users' needs.

There are tools in use today that serve both the professional programmer and the end user. The success of these tools lies in each using the same technology to achieve its separate ends. Given the right system, their ends will be the same. •

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Promise, reality

CONTINUED FROM PAGE S10

original form.

The DBMS vendors are answering these challenges by introducing their own CASE products. Cullinet Software, Inc., for example, is providing IDMS/Architect, a CASE software product line that works with its IDMS data base manager and ADS, the firm's fourth-generation language.

The strong competition on the data base front from the relational DBMS products, such as IBM's DB2, is also causing these companies to broaden their fourth-generation languages in order to support DB2 and its data manipulation language, SQL.

For example, Information Builders, based in New York, announced Focus support for DB2 in July, and Princeton, N.J.-based ADR last month announced its version of Ideal that will support DB2.

Lean on me

The increased competition in the data base arena, combined with a user focus on applications, is causing many vendors to rely more heavily on their fourth-generation language products than they would have in the past.

"Before, customers would choose the data base technology, and the DBMS was made more attractive by elegant and graceful applications tools," IDC's Burris says. "Now, the focus has changed to developing applications."

Stuart Miller, president and chief executive officer of Software AG, the Reston, Va.-based vendor of Natural, observes, "The key issue for our customers now is less the data base itself than the tools that surround it. The data base is only 30% of the decision."

Faced with all these choices, users are being cautious about how they apply the new technologies, including fourth-generation languages — which are not that new anymore.

"CASE, fourth-generation languages and application generators are all loosely linked to the applications development process, but there is no real strong interface between the tools and the code generators," Sherman says.

"If I were to design a shop," he explains, "I would get a CASE tool first and then an application generator or fourth-generation language that fits. But because most shops are in a heavy maintenance mode, they are using source code generators and fourth-generation languages only for new development." •

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



When is Data Language going to support SQL as well as its own language? When is it going to be able to talk to more than one data base at a time?

*John Harlow
Senior systems analyst
Bell South Enterprises
Atlanta*

DATA LANGUAGE CORP.: A prototype version of Progress, scheduled for release in

1988, is being tested that should address these questions. However, we have not yet determined how it will be packaged. We may release a new version of the product, V.5, or we may offer it as a special add-on package to work with Progress.

Regarding the product Dataflex, are there any plans to expand the number of indexes on a file to more than 10 or to expand the maximum number of lines per program beyond 5,000?

*Lester Dominic
President
Mortgageflex Systems, Inc.
Irvine, Calif.*

DATA ACCESS CORP.: Currently, there are no plans to expand the number of indexes. And, although there are no definite plans to expand the maximum number of lines per program, a revision of Dataflex will be announced that includes features that will allow users to override those limits.

Why did Goal Systems choose to incorporate source-level, rather than object-level, debugging?

*Ron Coleman
Systems programmer
Simplicity Patterns
Niles, Mich.*

GOAL SYSTEMS INTERNATIONAL, INC.: With source-level debugging, non-CICS programmers can write on-line application development. They are able to see programs as they are executed, one line at a time. They can set break points. They can display fields in both hex and character and make any changes to those fields, after which they can go back and reexecute the same line. They can also alter the normal program flow to execute error-handling code that checks the logic before they run into problems. With traditional object-level debugging, it would be more complex, if not impossible.

Is McDonnell Douglas going to replace Prokit Analyst with Prokit Workbench? Is it planning any enhancements for Prokit Analyst?

*Betsy Behnke
Senior information systems analyst
San Diego Gas & Electric Co.
San Diego*

MCDONNELL DOUGLAS CORP.: Prokit Analyst will continue to be an offering of McDonnell Douglas; we have no plans to phase the product out. Numerous clients and prospects continue to require a product that focuses solely on the generation of data flow diagrams, integrated with a data dictionary.

Regarding plans for enhancements of Prokit Analyst, customer input will determine what enhancements will be made. Because Prokit Workbench has been on the market a relatively short time, we are still in the process of gathering customer feedback and have not yet identified the most appropriate enhancements.

Does Oracle have any plans to upgrade the text-handling capabilities of Oracle Release 5? And does the firm have any plans to release an updated version of its report writer?

*Jeff Whitesell
Contractor
Synectics for Management Corp.
Washington, D.C.*

ORACLE CORP.: There really aren't any text quantity limitations on the product. Oracle supports 240 characters per field, an unlimited character field called a long field and thousands of tables per data base. We are following the SQL standards, so the text handling is not an Oracle constraint. Plans to upgrade with Version 6, which may include a new report writer, are being worked on.

Is ADR going to incorporate an automated means of moving source code between test and product regions in any forthcoming releases of Ideal? Also, when is Ideal Escort going to function as a mainframe Ideal workstation?

*Dave Arns
Data base administrator
Pacific Power and Light Co.
Portland, Ore.*

APPLIED DATA RESEARCH, INC.: In Version 2 of Ideal, scheduled for first-quarter 1988 delivery, a source transport utility for moving applications source code to and from external environments will be included.

The basic mode will enable users to change applications or even generate a new application outside of the Ideal environment and restore it as the same or different version. ADR is also studying a mode that will allow users to export

Continued on page S20

New Release!

SPF/PC™ 2.0

EDIT1A C:\COBOL\SOURCE\DFHXCALL.COB
COMMAND
000062
000063
000064
.A
000066
000067
000068
000069
000070
000071
000072

FIN. GO TO CICS-CONTROL.
READ-INPUT.
EXEC CICS HANDLE CONDITION MAPFAIL(NOTMODF) NOTFND(NOTFOUND)
ERROR(ERRORS) DUPREC(DUPREC) END-EXEC.
EXEC CICS RECEIVE MAP('XDFHXCMB') END-EXEC.
IF EIBTRNID = 'UPDT' THEN
EXEC CICS READ UPDATE DATASET('FILE') INTO(FILEA)
RIDFLD(NUMB = FILEREC IN COMAREA) END-EXEC
IF FILEREC IN FILE NOT = FILEREC IN COMAREA THEN
MOVE 'FILE ALREADY UPDATED - REENTER' TO MSG10
END-EXEC.

SIZE	CDATE	TIME
7688	01/12/87	12:42p
2568	03/26/86	8:02a
1536	03/29/86	10:33a
1536	11/25/85	11:07p
6144	01/12/87	12:48p
1024	01/07/86	8:11p
2048	10/30/85	9:47p

EDIT2A C:\COBOL\SOURCE*.COB
COMMAND
NAME EXT
ADDDENTRY COB
ADDMENU COB
ASKDANGR COB
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SCROLL → DATA

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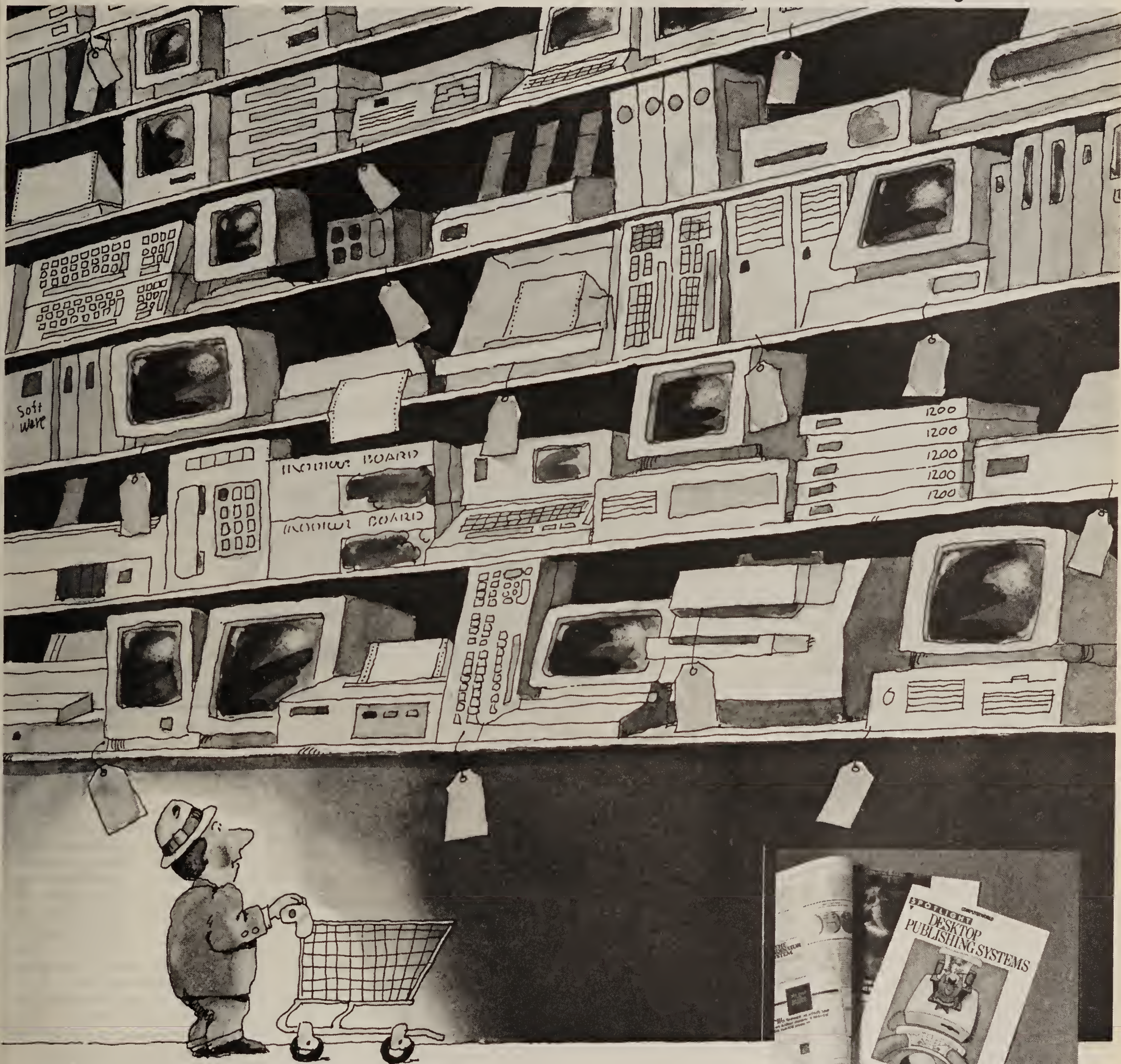
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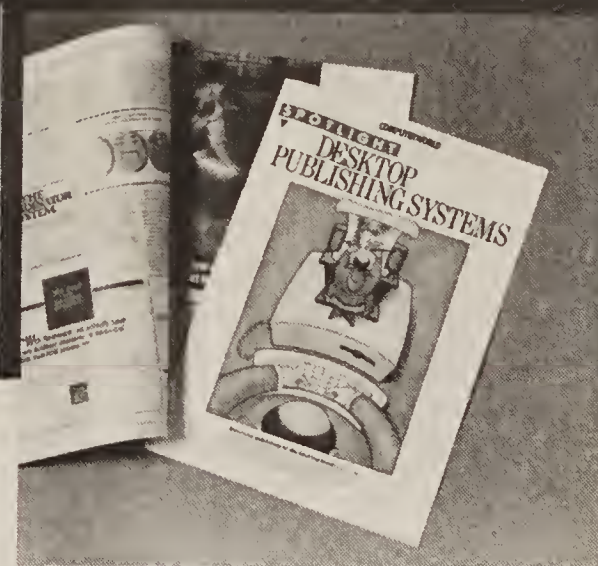
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Implementing CASE: From strategy to reality

BY BARBARA BOULDIN

In a world becoming increasingly mechanized by computers, the time has finally come to mechanize the jobs performed by MIS professionals.

This automation of the automator is not likely to be a smooth evolution, however. The average MIS staff is not only overworked and behind schedule, but it is also faced with a steady barrage of new technologies, theories, methodologies and tools.

Some of these innovations are helpful, and some are not. It is not uncommon, for example, for upper management to adopt one of the increasingly popular computer-aided software engineering (CASE) tools as a solution to everyone's problems, without giving serious consideration to whether the tool is really appropriate for the organization.

More often than not, the difficulties of

Bouldin is staff manager of the Data Management Group for Customer Premise Equipment Systems for AT&T Network Operations Group in Parsippany, N.J. She is currently writing a book on technology transfer, *Agents of Change*, that will be released by Prentice-Hall, Inc. next summer.

implementing CASE technology relate very little to the quality of the tool itself but rather to the intangible but real obstacles associated with overcoming resistance.

Change in attitude

In groups that do achieve any substantial improvement, what occurs is a fundamental change in attitude that borders on a cultural revolution.

Several years ago, when we implemented Index Technology Corp.'s Excelerator in the Services Division of AT&T, our organization consisted of 50 work groups.

Each group was responsible for different aspects of developing and maintaining 20 major applications, such as an order processing system, a customer record data base or product and service analysis.

We began with the conviction that everyone would welcome major changes in his daily work life for the cause of improved productivity. This, we discovered, was a misguided notion.

Although everyone was tired, overworked, behind schedule and in need of a



STEPHEN FERRY/GAMMA LIAISON

The Services Division support group currently includes (left to right) Dave Turner, Fran Collier, the author and Nancy Alm.

variety of support products, implementing an ultimate solution was no one's priority. The priority, we were told, was putting in a production fix by 6:00 a.m. tomorrow.

It should be noted that before reaching this point, we had determined that analyst support was definitely needed. Excelerator had been selected after careful evaluation, and its implementation had been economically justified. My boss, the district manager of the order processing system, had even sold the concept to upper management.

Initial resistance

Only after successful completion of these preliminary activities was a Development Tool Group — consisting of myself and one other woman — formed and charged with the mission of implementing the CASE tool for 400 MIS professionals.

Despite all of this groundwork, what we immediately encountered was a tremendous amount of user resistance. Many people agreed with us in theory but had little time or energy to expend on improving the situation. Some viewed the entire effort as a reflection on the quality of their performance. Others simply were frightened by the implications of change.

Given the extent of resistance, we had to rethink our implementation strategy. While we reassessed our position, we initiated a marketing effort designed to communicate the benefits of the tool to users — in their own terms.

We correctly perceived that lessening resistance must begin with a sales job, but it was a soft sell. We made numerous presentations, always using the vocabulary of our own systems so that users could readily relate to examples of the product's usefulness.

We also took the opportunity during this time to informally interview our users. These interviews served a dual purpose, allowing us to probe for the realities behind the users' resistance and to identify the opinion makers within the individual work groups.

One interesting insight that emerged

as a result of this exercise is the fact that the true influencers within groups are frequently not the managers.

An interproject team, made up of members of the different groups, was formed to facilitate and coordinate the cultural change required for the implementation. We encouraged every group in our organization to participate.

Our theory was that the more people that were actively involved in the change process, the less resistance we would encounter. Instead of imposing our ideas, we worked with the team to develop standards, naming conventions and detailed plans for the implementation. Some of the team members shared information with their groups.

Based on the information gathered through interviews and the project team's input, we developed a basic course of di-

rection. Some of the principles we employed in determining how to proceed were based on the twin objectives of searching for successes and providing intermediate deliverables.

No matter how visible or glorious a particular path appeared, we reject-

ed any plan with a high risk, a long time frame or ambitious objectives.

The theory was that the sooner we could actualize some benefit — even a small one — the sooner users would begin to accept and advance the process of change. Then our vision would become reality, and the change process would have succeeded.

Stop planning, start doing

All of this selling, planning and analysis occupied several months. It could have stretched on indefinitely, but it is critical to know when to stop planning and start doing. The planning process is so seductive that many organizations never get any further.

Instead of selecting a single project or work group, we began our implementation with the data shared by our applications. We had adopted a service orientation and vowed never to disrupt the daily work of our users.

In keeping with that vow, we gathered



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existing documentation about our systems and had data entry clerks working at the Excelsior workstations prior to having the DP staff use them. We requested MIS staff members to review and verify the results of this activity at their convenience.

To each his own

Individual group members typically verified the portion of the project for which they were responsible, which meant both that the end product was accurate and, more important, that many people were pulled into the development process.

We then needed to enable the MIS staff to use the workstations. One way we overcame resistance to this was meeting each user on his own ground. We allowed each to learn at his own

WE ALLOWED each user to learn at his own pace and level, adding features in increments until, finally, the tool's total benefit was realized.

pace and level, adding features in increments until, finally, the tool's total benefit was realized.

This concept of tailoring the change process was extended to customizing the implementation for each project team. Typically, we would hold a strategy meeting with a project team and jointly set forth a strategic direction for that particular group to incorporate CASE.

We did not even hint that anyone should change the format of his documentation; every group retained its own approach to systems development. But we did offer some consistency in the piece parts, such as record layouts, that made up each document.

Although this may all seem quite obvious, it would be a mistake to underestimate the difficulty of achieving this kind of flexibility. It is not a simple matter to constantly assess each individual and then tailor the implementation to suit the situation.

We monitored our plan continuously both to ensure that we were on schedule and to verify that each task still made sense.

Official acceptance

After three months, the data that was shared by our applications had finally been loaded into Excelsior, reviewed and signed off.

One day, I was at a meeting at which the discussion revolved around which version of the record layout from the marketing system to the customer data

base was the correct one.

Someone suggested that we determine accuracy by checking against the Excelsior dictionary. After all the time and effort invested, this was the first instance of official acceptance, the moment when the vision became a reality.

Did widespread use begin the next day? No. Did we begin to have users? Yes. Both the user

community and the amount of use steadily increased. Ultimately, a moment came when our group and its function were unequivocally accepted by the organization.

We still had work ahead of us, but we also knew that we had fundamentally changed the way people performed their jobs and improved productivity by a small but critical measure. •



AT&T's Barbara Bouldin

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Business Software Technology, Inc. (617) 870-1900 Endevor-DB

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can be used for reporting in on-line or batch modes.

ESI (904) 575-0179 Basys Plus

A file-compression and storage system for Unisys Corp. (formerly Burroughs Corp.) medium-scale systems. Includes an on-line dictionary for all files in both the off- and on-line portion of the data base. Provides support for multiple generations of a file.

Goal Systems International, Inc. (800) 848-4640 PDSMan/XP

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Enables collection and maintenance of historical audit trails and current time stamp information. For use with IBM's VSE; includes CMS support.

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VMLib

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Gerald Cohen
Herbert Schorr

Dr. Larry Harris
Dr. Eric Firdman
Steve Oxman



A Digital Consulting, Inc. Conference©

The Expert Systems and Artificial Intelligence Symposium

WHAT YOU SHOULD KNOW ABOUT AI/EXPERT SYSTEM TECHNOLOGY

AI and expert system tools are evolving rapidly to support the business environment. Practical business applications of knowledge engineering include diagnosis and treatment of system malfunctions, configuration of systems, scheduling of complex tasks, intelligent design aids, design of complex components, evaluation of multiple alternatives, oil well drilling advisor, medical advisor, investment advisor, credit card transaction authorization, intelligent text and data base retrieval, methodology guidance, natural language interpretation, speech interpretation, and many others. Expert systems are well adapted for applications that require searching, interpretation, prediction, explaining, knowledge fusing, diagnosis, configuring, scheduling, monitoring, planning and giving advice.

A very significant trend is the combination of traditional data processing techniques with knowledge engineering techniques. Expert systems are now available that run on standard business machines, access corporate data bases and augment the capability of traditional business systems. These systems enable DP applications to incorporate rule processing in addition to traditional data processing.

As shown in Figure 1, key functions of business-oriented expert systems include the ability to access both a knowledge base and a corporate data base, while providing an intelligent interface to the user. Key features to look for include the following:

Knowledge Base: Expert systems provide access to a knowledge base containing facts, rules of inference, objects and models for a particular domain of expertise.

Knowledge Base Management System (KBMS): Access to the knowledge base is provided by the KBMS which includes a language for processing knowledge, a mechanism for searching and applying the facts and rules in the knowledge base (i.e., an inference engine), a control strategy for organizing the rule search and a means of explaining the sequence of rule firings that lead to a solution. The KBMS should be able to read and write information from the data base management system.

Data Base and DBMS: The corporate data base contains facts about the application (i.e., customer names, invoices, part numbers, etc.). An industry standard data base management system (e.g., IMS, DB2, IDMS/R, ADABAS, ORACLE, etc.) is typically used to access the corporate data.

Application Program: Business application programs should be able to utilize the DBMS to access the corporate data base and the KBMS to apply rules of inference to the facts in the data base. The use of an industry-standard language, such as SQL, facilitates access to both the data base and the knowledge base. The tool set should encourage the building of prototype applications (i.e., the specification of screens, reports, menus, transaction sequences, procedural logic, data base access, knowledge base access and inference processing).

Intelligent Human Interface: An important function of the expert system environment is to provide an intelligent interface to the end user. The human interface should operate in an intuitive manner, requiring little or no user training. Functions supported by the intelligent interface may include a natural language processor, speech interpreter, smart command editor, intelligent data base or text retrieval mechanism, and methodology guidance.

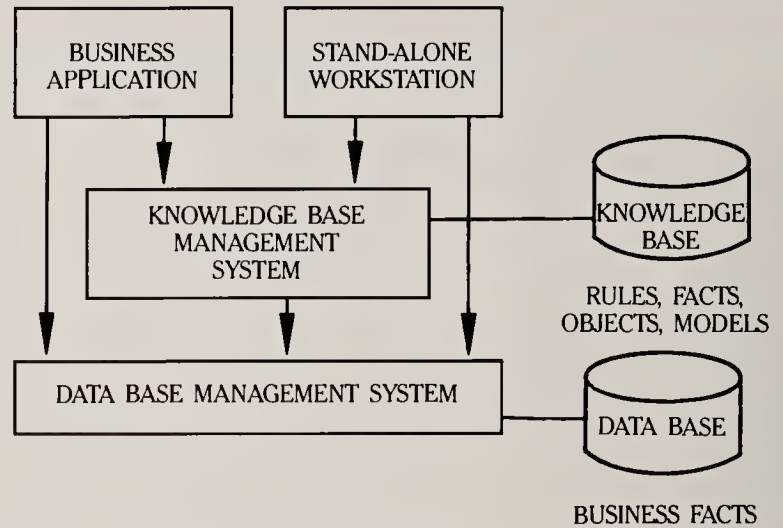


Figure 1. Integration of Business Application and Expert System Techniques

The functions of representative business-oriented expert system tools are described in Figure 1. Products which implement these and other key features will be discussed, contrasted and compared at the Symposium.

MAJOR BENEFITS OF AI/EXPERT SYSTEM TECHNOLOGY

The AI/expert system revolution will bring the following benefits to business organizations:

- **Mass replication of business knowledge and expertise.** Knowledge gained by experts through many years of experience can be made available selectively to other members of the organization.
- **Integration of knowledge base with corporate data base.** Business applications can gain access both to corporate data and to knowledge that defines how to make effective use of the data within the organization.
- **Extended decision-making capability.** The knowledge base of business procedures and accumulated experience may be used to augment and extend the decision-making capability of business managers.
- **Guidance in the use of complex procedures.** Expert systems may be used to train analysts in the use of new, complex procedures and tools. These systems may also be used in an "intelligent assistant" mode to guide experienced analysts in the application of a corporate-defined development methodology.
- **Improved human interfaces to computers.** A knowledge base of business-related experience may be utilized to simplify the human interface to the computer and to provide intelligent support for the business function being performed.

Atlanta, December 14-16, 1987 San Francisco, January 25-27, 1988

THE EXPERT SYSTEMS AND ARTIFICIAL INTELLIGENCE SYMPOSIUM FORMAT

DAY ONE of the Expert Systems and Artificial Intelligence Symposium provides a complete review of the technology: the major trends, characteristics, components and life cycle of the software; a review of vendor products and practical business applications; and a look ahead to future trends.

DAYS TWO AND THREE of the Symposium consist of one-hour product presentations from all of the leading developers of AI and Expert Systems products. Consultants from DCI will be available to direct you to the right presentations and answer your questions on AI/Expert Systems technology. Distinguished guest speakers, including Dr. George Schussel, Dr. Larry Harris, Herbert Schorr, Dr. Eric Firdman, and Gerald D. Cohen, will appear during the luncheon and afternoon to share their insights into where this technology is heading and what business applications are already available. Evening hospitalities will allow you to actually see and test the leading AI/Expert Systems products hands-on.

DAY ONE—SEMINAR LEADERS



JAMES MARTIN CHAIRMAN

James Martin has been described by *Computer Weekly* as the "computer industry's most widely read author and best attended lecturer." He has lectured to more than 20,000 DP professionals worldwide and has written nearly 50 best-selling books on computer/communications technology. Currently, Mr. Martin serves as chairman of James Martin Associates. His consulting work has included studies at the top management level for AT&T, IBM, Honeywell, Texas Instruments, GTE, DEC, ICL, Xerox, and numerous other firms in the computing and telecommunications industries.

Photography Courtesy of Deltak Training Corporation.



STEVEN W. OXMAN is the president of OXKO Corporation, a small hi-tech firm specializing in the Knowledge Engineering, Data Management, and Systems Integrations areas. Prior to founding OXKO, Mr. Oxman worked for the U.S. government in the computer science field. Assignments included Data Management research for NATO while working for the American Embassy in the Netherlands as well as helping the Dutch government introduce AI (Artificial Intelligence) and IT (Information Technology) on a national level. Mr. Oxman started his research in the AI arena in 1982 and has since been very active in the area of expert systems technology and the transfer of that technology to industry and government.

SEMINAR OUTLINE

1. Outline of Expert Systems and AI Technology

- What is expert system technology?
- Why is it vitally important for business applications?
- What business problems does it solve?
- How can rule processing be used in standard DP applications?

2. Examples of Business Applications of Expert Systems

- | | |
|-----------------------|---------------------|
| a. Trading systems | g. Scheduling |
| b. Authorization | h. Configuring |
| c. Financial analysis | i. Advice giving |
| d. Process control | j. Predictions |
| e. Planning | k. Explaining |
| f. Training | l. Knowledge fusing |

3. Categories of Expert Systems

- Packaging expertise for use by non-experts
- Improving the performance of technicians, business professionals, and management
- Systems which outperform top experts

4. Components of Expert Systems

- Knowledge base
- Inference processor and control mechanism

- Human interface
- Knowledge acquisition facility

5. Review of Vendor Products

- Expert systems for standard business environments
- Expert systems for IBM PCs
- Expert systems for standard minicomputers
- Expert systems for standard mainframes
- Expert systems for non-standard hardware
- Natural language processors
- Rule-based query systems
- Front-end products incorporating expert systems
- Speech input to machines

6. Expert System Environment

- PC workstations and tool sets
- Minicomputer tool sets
- Mainframe tool sets
- Special-purpose machines
- Integrated environment

7. Expert System Life Cycle

- System concept and analysis
- Specification of knowledge representation
- Specification of interface processor and control mechanism

- Knowledge acquisition
- Specification and development of human interface
- Initial prototype testing
- Evolution to production system

8. Benefits of Expert Systems for Business Applications

- Mass replication of scarce expertise
- Management of complexity
- Improved performance of technicians, business professionals and management
- Extended decision-making capability
- Automated design and programming
- Methodology guidance

9. Related Technologies

- | | |
|------------------------------|-----------------|
| a. CASE front ends | d. Speech input |
| b. Intelligent workstations | e. Linguistics |
| c. Development methodologies | f. Robotics |

10. Future Trends

- Integration of expert systems, 4GLs and CASE technology
- Inference processor add-ons to standard business machines
- High-performance parallel machines
- Continuous speech input systems
- Real-time operation of expert systems

Aion Corporation

Aion Corporation of Palo Alto provides a complete line of inference-based programming tools for the design, development, delivery, and maintenance of MVS/TSO, MVS/CICS, IMS DB/DC, VM/CMS, and PC/DOS applications. Aion's ADS environment will be presented with special attention to issues of cross-system transportability, data access, life-cycle management, economic benefits of inference-processing in conventional application development, and opportunities for advanced expert-systems applications.

Artificial Intelligence Technologies, Inc.

The AIT LISP TOOLKIT was developed to provide an environment for building expert systems characterized by requirements for integration with existing systems, distribution over multiple processors, cooperating expert systems, and time critical response. The TOOLKIT runs under VMS and simplifies development and delivery of expert systems on the VAX.

Computer Sciences Corporation

Computer Sciences Corporation, Technology Activity: CSC's Design Generator is an Object-Oriented, expert system that automatically selects a central transform from a dataflow diagram and generates an initial design in structure chart notation. The graphic-intensive user interface features point'n'click, pop-ups and multi-pane browsers.

Digital Equipment Corporation

Digital Equipment Corporation, a leader in AI technology, products and services, presents its latest offerings for the expert system/AI developer and user. In addition to the VAX family of computers, Digital's AI offerings include VAX LISP V2.2, VAX OPS5, Neuron Data's NEXPERT OBJECT, Digital's AI Consulting and Educational Services, and Digital's Technology Transfer program.

EXSYS Inc.

EXSYS provides an environment for the rapid and easy development of powerful expert systems on MS-DOS, UNIX and VAX/VMS by non-AI professionals. Rules, an optional FRAME extension and easy interface to any other program for data acquisition or customization allows easy incorporation with existing systems and great flexibility. Automated tutorials get novice users creating systems in 1-2 days. High speed allows real-time systems to be developed.

Gold Hill Computers

Gold Hill Computers' 386 Hummingboard is an Intel 386-based board, running at 16 and 20 MHz,

designed to run large LISP applications faster. The board's directly addressable memory is expandable to 24 megabytes. GoldWorks is an expert system building tool for developing and delivering knowledge-based expert systems on personal computers. It combines a knowledge base, inference engine, and a multi-level open architecture.

IBM

Expert System Environment is an expert system shell with an extensive tool set for building and consulting knowledge bases. Although it provides a very rich set of features and functions, developers and end users can learn to create and use knowledge bases in a short period of time. Expert System Environment greatly enhances application development productivity because the application expert is directly involved. Expert System Environment directly supports interaction between the knowledge base and strategic data base, graphics and procedural subsystems.

Information Access Systems, Inc.

The Intelligent Text Management System (ITMS) has been installed as the base system for many Expert information management applications designed and implemented by IAS. Based on general and/or industry (or domain) specific knowledge representation models, the ITMS permits ordinary language queries of large document bases. Installed ITMS systems have significantly increased the productivity associated with the classification, retrieval and distribution of both unstructured textual material and formatted field data.

Information Builders, Inc.

Information Builders, Inc., the developer of the FOCUS fourth generation language, has recently acquired Level Five Research, one of the leaders in practical expert systems implementation. Currently IBI is offering two expert system tools, PC LEVEL5 and VAX LEVEL5. The tools are particularly useful in applications that require a high degree of integration with installed software and existing customer databases.

IntelliCorp

IntelliCorp is the industry's leading provider of high-end knowledge systems development software. IntelliCorp will present: the Knowledge Engineering Environment (KEE) system, the most widely-used software for developing large-scale applications; the new KEEconnection software, for integrating KEE applications and SQL databases; and, SimKit, a KEE-based modeling and simulation product.

Presenter

Aion Corporation

Artificial Intelligence Corporation

Artificial Intelligence Technologies, Inc.

Computer Sciences Corporation

Digital Equipment Corporation

EXSYS Inc.

Gold Hill Computers

IBM

Information Access Systems, Inc.

Information Builders, Inc.

IntelliCorp

KnowledgeWare, Inc.

LogicWare

mdb, Inc.

Neuron Data

Programs in Motion Inc.

Texas Instruments

Transform Logic

UMECORP

Unisys Corporation

Xerox

A N D T H R E E

Product

AION DEVELOPMENT SYSTEM
INTELLECT
AIT LISP TOOLKIT
DESIGN GENERATOR
DIGITAL'S RANGE OF AI PRODUCTS & SERVICES
EXSYS EXPERT SYSTEM DEVELOPMENT SOFTWARE
GOLDWORKS/HUMMINGBOARD
IBM EXPERT SYSTEM ENVIRONMENT
ITMS
ITDS
J-SPACE
LEVEL5
KNOWLEDGE ENGINEERING ENVIRONMENT (KEE) SYSTEM
SIMKIT
KEE CONNECTION
INFORMATION ENGINEERING WORKBENCH GAMMA
TWAICE
GURU
NEXPERT OBJECT
1st-CLASS
1st-CLASS FUSION
EXPERT SYSTEM DEVELOPMENT USING PERSONAL CONSULTANT
ADVANCED AI APPLICATIONS USING THE EXPLORER FAMILY
TRANSFORM
EXPERT CONTROLLER
XPS-85
UNISYS R & D EXPERT SYSTEMS
XEROX ARTIFICIAL INTELLIGENCE PRODUCTS

KnowledgeWare, Inc.

KnowledgeWare, Inc. provides software tools to automate MIS/DP. The Information Engineering Workbench/Workstation uses CASE techniques automating creation, validation, and maintenance of decomposition, entity-relationship, data-flow, and action diagrams. The expert system module validates process and data models against hundreds of structured logic rules, deciphers diagram meaning, and stores this in the knowledge-base immediately reflecting changes in any diagram.

LogicWare

Logicware provides expert system development tools tailored for mainstream, corporate MIS and DP environments. LogicWare will be demonstrating TWAICE, a powerful, portable, and integrated expert system shell and knowledge engineering environment. TWAICE is available on IBM mainframes under VM/CMS and MVS/TSO, DEC VAX, M6800 workstations and IBM PC/AT and PS/2 under PC-DOS and OS/2.

mdbs, Inc.

mdbs, Inc., an internationally-recognized producer of software development tools, will present GURU. GURU is an expert system environment for application developers. It blends rule-based expert system technology with traditional information management processes. GURU is available on single user PCs, local area networks, and the entire range of VAX computers.

Neuron Data

Nexpert is an object oriented expert system shell developed by Neuron Data, Inc. Nexpert supports variable rules and a combination of forward and backward chaining. It includes capabilities of both frame representation, which has multiple inheritance, and of pattern matching rules. The system can automatically generate graphical representation of network of rules. It offers direct access to relational databases and it's delivered as a sharable image.

Programs in Motion Inc.

President William Hapgood developed the product 1st-CLASS which has made the company an industry leader in expert system tools. 1st-CLASS FUSION was introduced in July of 1987. Programs in Motion Inc., having sold over 1,000 copies of 1st-CLASS continues to expand both their domestic and foreign markets. They have achieved their goal to develop the best expert system shell that offers ease of use, reasonable cost and powerful features all in one.

Texas Instruments

Personal Consultant is the industry's leading expert system development tool for PC-based AI applications. The series includes Personal Consultant Easy, and Personal Consultant Plus. The Explorer family of high-performance symbolic processing computers includes the recently announced Explorer II, the industry's current price/performance leader. The systems are used primarily for development and delivery of knowledge-based applications.

Transform Logic

Transform Logic's TRANSFORM product family automates COBOL application software design, development and maintenance in IBM mainframe environments. Transform Logic will present the concepts behind development automation and application base management using TRANSFORM. Data driven design architecture, environment independence, and design prototyping are features of this approach.

UMECORP

The Expert Controller from UMECORP is a dedicated programmable high-speed expert system computer consisting of a host-independent asynchronous processing microcomputer using low-power CMOS technology and proprietary software. Included are communication drivers for interfacing the Expert Controller to machinery in real-time operating environments. Also, UMECORP is presenting XPS-85, a language for knowledge-based factory automation.

Unisys Corporation

In order to support acquisition and maintenance of large real-world knowledge bases for expert systems, Unisys has developed KNET, a data structure for recording semantic relations. KNET forms the nucleus of the Unisys R&D projects, KSTAMP and Beacon. KSTAMP is an expert system designed for diagnosing problems in complex electrochemical equipment. BEACON is an expert system designed for use in configuring large computer systems.

XEROX

XEROX products for expert systems development and delivery include the Xerox Artificial Intelligence Environment (XAIE) integrated with the Xerox 1186 and Xerox 1185 Artificial Intelligence Workstations. The Xerox 1186 is a powerful Lisp machine that delivers superior cost/performance for AI application development. The Xerox 1186 brings superior Lisp performance at low cost to users for application delivery.

Guest Speakers



DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is president and founder of Digital Consulting, Inc. a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs. Dr. Schussel is also Chairman of the National Database and 4th/5th Generation Language (DB & 4/5GL) Symposia. His influential role in the industry prompted *ICP Interface* to name him the "Guru of Data Base Management."

5th Generation Technologies: Where's the Beef?

Topics:

- The Need for Productivity Demands New Approaches
- The Fifth Generation
- Computer Aided Software Engineering (CASE)
- The Future of Data Management Software
- Programmer Workstations
- The End of Canned Applications
- Artificial Intelligence—the Limitations
- The New Technologies Will Affect How You Organize Your Department and Company

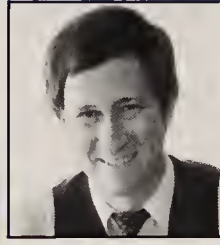


DR. HERBERT SCHORR, group Director of Advanced Systems, Information Storage and Systems Group with IBM, heads the Artificial Intelligence and Image Champions for IBM and is responsible for products, marketing, and internal applications of these new technologies. Dr. Schorr received his Ph.D. in Electric Engineering from Princeton and has served on the faculty at Columbia University. Dr. Schorr is a member of the Institute of Electrical and Electronics Engineers and the Association for Computing Machinery.

Knowledge-Based Systems: Recent Applications and Future Directions

Topics:

- How knowledge-based systems improve business productivity
- Successful integration with traditional data systems—the biggest payback
- Recent customer and internal applications
- New directions will provide the necessary products and support for users



DR. LARRY R. HARRIS is founder and Chairman of the Board of Artificial Intelligence Corporation. Dr. Harris is an internationally recognized authority on all aspects of AI technology, especially with regard to natural language and expert systems. He received his PhD in Computer Science from Cornell University specializing in AI and has authored the INTELLECT natural language information system. Dr. Harris is also the author of the book, *Artificial Intelligence Enters the Marketplace*.

Expert Systems Technology in the Marketplace

Topics:

- The Evolution of Expert Systems Technology in the Corporate Environment
- Expert Systems Tools Requirements
- The Four AI Paradigms in an Expert System



DR. HENRY ERIC FIRDMAN is one of the leading independent practitioners and consultants on Artificial Intelligence subjects. Prior to emigrating to the USA, he was director of the largest AI research laboratory in the Soviet Union. In the six years he has been in the USA, Dr. Firdman has worked on the development of expert systems and knowledge based systems for Arthur D. Little, Access Technology, Inc., Software Collaborative, Ltd. and Hewlett-Packard. He has authored nearly 100 publications and has lectured to many audiences on AI topics.

Expert System Development in the Workplace

Topics:

- Expert Systems Applications in the Workplace
- The Five Major Pitfalls of Expert Systems Application and How to Avoid Them
- Actual Case Histories



GERALD D. COHEN is the President and founder of Information Builders, Inc. He is a leader in the area of software portability and has engineered FOCUS for operation on IBM mainframes, DEC, WANG, and UNIX computers, plus an IBM/PC version. Mr. Cohen was previously a Vice President of Mathematica, where he developed the original RAMIS system. He pioneered non-procedural computer languages and created the first 4th generation language. He holds a Master's Degree in Operations Research from Columbia University and a Bachelor of Mechanical Engineering from CCNY.

The Merging of Database and Expert Systems

Topics:

- The Integration of Database and Expert Systems Technology
- Expert System Applications

Special Features

BY ATTENDING THE EXPERT SYSTEMS AND AI SYMPOSIUM YOU WILL LEARN:

- AI and expert system technology may be used in combination with traditional data processing techniques to solve business problems.
- What standard business data processing environments are supported by leading AI/expert system products.
- What types of business problems are especially appropriate for solution by expert systems and artificial intelligence.
- What components and functionality you should look for in AI/expert system products.
- How to categorize, evaluate and compare AI/expert system products.
- How to integrate AI/expert system technology within your current DP organization.
- WHO THE KEY PLAYERS ARE IN AI/EXPERT SYSTEM TECHNOLOGY.

PROCEEDINGS

Each Symposium attendee will receive a copy of our "Expert Systems and Artificial Intelligence Symposium" Proceedings. This resource document will serve as a useful reference long after the Symposium is over.

HOSPITALITY SUITES

These suites provide a relaxed environment in which you can ask questions and socialize with industry leaders. Enjoy the product demos and the chance to relax and share the company of fellow attendees.

AI/EXPERT SYSTEM TECHNOLOGY REVOLUTIONIZES AND IMPROVES BUSINESS SYSTEMS BY:

- Packaging expertise for use by non-experts (i.e., financial planning, investments, hobbies, etc.).
- Improving the performance of technician systems (i.e., credit card authorization, scheduling systems, oil drilling advisory systems, equipment diagnostic systems, etc.).
- Providing aid to top experts (i.e., knowledge engineering systems for seismic analysis, medical diagnostics, financial analysis, oil prospecting, etc.).
- Providing access to both a data base of facts and a knowledge base containing rules on how to utilize the facts.
- Adding rule processing to traditional DP applications.
- Improving the capability of decision support systems through the use of expert system techniques.
- Incorporating methodology guidance within front end tools in order to provide intelligent assistance to experienced analysts.
- Providing a new training environment for complex tools that uses expert system rules to lead the trainee step-by-step in the most effective way to learn new techniques.
- Building expert system capability into computer-aided software engineering (CASE) tools.

WHO SHOULD ATTEND

- Information Center Managers
- MIS Consultants
- Expert Systems Implementers
- MIS Directors and DP Managers
- Programming Managers
- Executive and Senior Management

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- 7—Expert Systems and AI Toolkits
- 8—PC Tools
- 9—Relational Database Management Systems (*early '88*)
- 10—Network Management Tools (*early '88*)



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Third Registration	\$795
Fourth Registration	FREE
Fifth Registration and Over	\$795
Day One Seminar Only	\$595

GROUP ATTENDANCE: Previous attendees of our Symposia have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Our discount structure is designed to encourage multiple registrations from the same company. Have you considered sending representatives from different departments, divisions, or locations within your organization?

IN-HOUSE SEMINARS

We can bring many of our seminars in-house to your company. Our in-house seminars are one of the most cost-effective ways to update your managers and professionals about the leading software technologies. For more information, call (617) 470-3870 and speak with our In-House Seminar Coordinator.

DIGITAL CONSULTING, INC.

These seminars will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is headquartered at 5 Kimberly Terrace, Lynnfield, MA 01940, telephone (617) 470-3870.

CANCELLATION POLICY

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of \$100. Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

To receive a current catalog of DCI sponsored seminars and conferences, call (617) 470-3880.

MEETING SITES AND HOTEL ACCOMMODATIONS



Atlanta Marriott Marquis December 14-16, 1987

Located in the heart of Atlanta's Peachtree Center, the city's prestigious office and shopping complex, the Atlanta Marriott Marquis features 1,674 beautifully appointed guest rooms, a soaring 47-story atrium, Atlanta's only indoor-outdoor pool, and a full service health club. For dining and relaxation, the hotel boasts 5 elegant restaurants and lounges. The hotel is within minutes of many of Atlanta's sites and is connected by Rapid Rail (MARTA) to a host of other attractions. The hotel is located at 265 Peachtree Center Avenue, Atlanta, GA 30303, (404) 586-6145.



Hyatt Regency San Francisco January 25-27, 1988

Located in downtown San Francisco, the Hyatt Regency Embarcadero Center is a landmark in luxury, service and cuisine. The Hyatt Regency boasts four distinctive restaurants and lounges: Mrs. Candy's for casual dining, The Other Trellis for cocktails, The Market Place for intimate California cuisine, and the incomparable Equinox for leisurely cocktails and dining with a revolving view of the city. Embarcadero Center is a wonderful place to shop and dine among fountains, bay views and internationally famed artworks. The hotel is located at 5 Embarcadero Center, San Francisco, California 94111, (415) 788-1234.

REGISTRATION FORM

The Expert Systems and Artificial Intelligence Symposium

- ☐ 1068. Atlanta, December 14-16, 1987
☐ 1080. San Francisco, January 25-27, 1988

TYPE OF REGISTRATION

- ☐ **Single Full 3-Day @\$995**
☐ **Day One Only @\$595**
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☐ Confirms telephone registration

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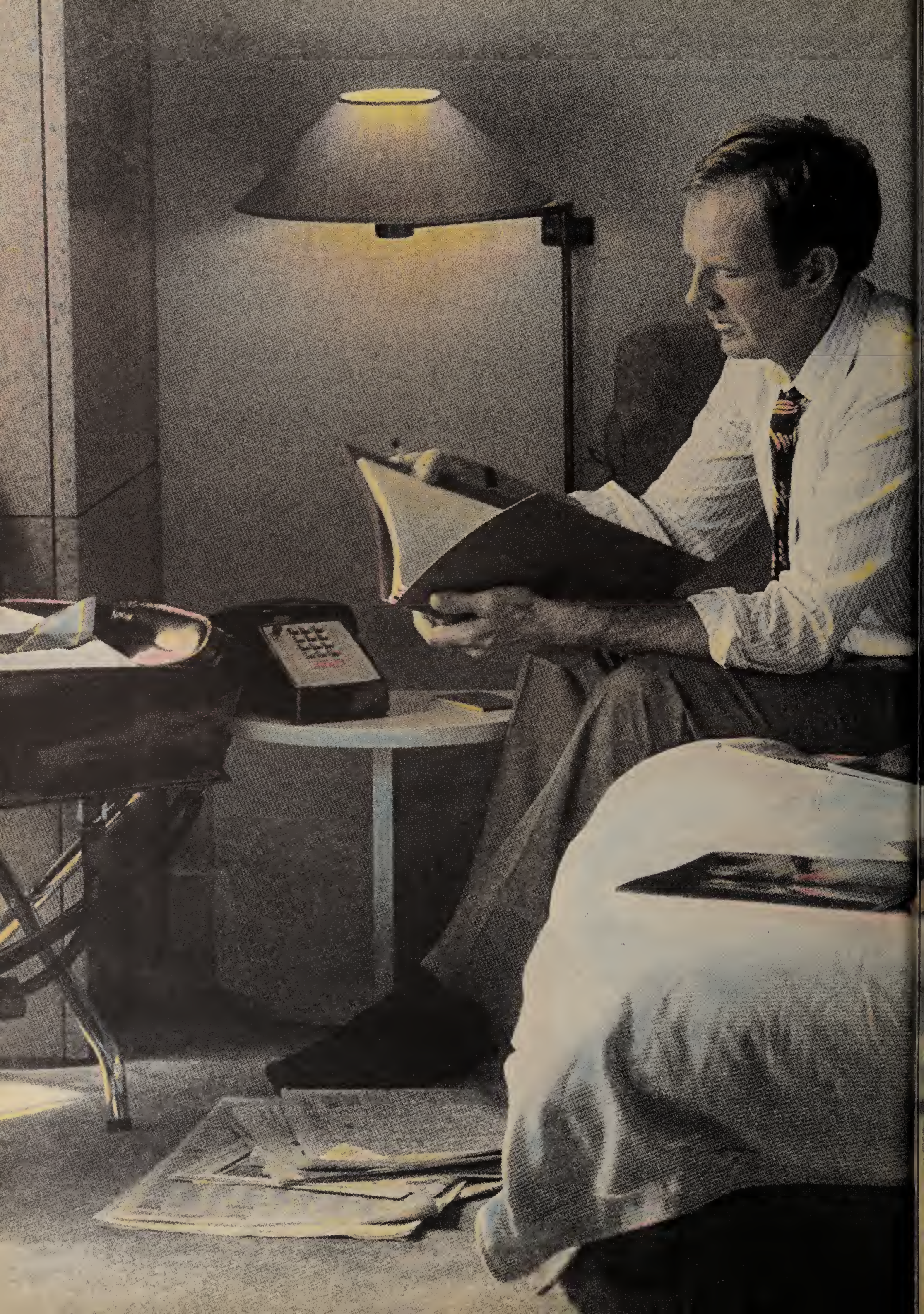
Programmer tools

COMPANY	PRODUCT	OPERATING SYSTEM	RUNS ON	DEVELOPMENT ENVIRONMENT SUPPORTED	EXECUTION ENVIRONMENT SUPPORTED	DBMS SUPPORTED	BUILT-IN COMPILER OR INTERPRETER CAPABILITY	POINT OF CONNECTION TO COMPILER OR INTERPRETER	SUPPORTS ON-LINE VOLUME APPLICATIONS	SUPPORTS REAL-TIME APPLICATIONS	INCLUDES TEST AIDS	INCLUDES DEBUGGING FACILITIES	INCLUDES A DATA DICTIONARY	DATA DICTIONARY INTERFACES	INCLUDES EDITOR	INCLUDES SCREEN PAINTER	PRICE
Adpac Computing Languages Corp. (415) 974-6699	Diagraphics for Data Processing	MVS, MVS/XA	Mainframes running MVS, MVS/XA	TSO	MVS	All	No	Via source code	Yes	Yes	No	No	Yes	DB/DC, proprietary dictionary, Datamanager, Cullinet Interactive Data Dictionary	Yes	Yes	\$19,500
Apscor International (312) 698-4000	Cue-Bic	Pick	DEC systems under Ultimate, McDonnell Douglas, Pyramid, C. Itoh, IBM using Pick 370, Prime, V-Mark's Universe, Revelation	Pick	Pick	Pick	—	—	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	—	Yes	Contact vendor
Adrem, Inc. (617) 235-2223	Guest/IDT	DOS/VSE, MVS (VM/CMS in first-quarter '88)	IBM and plug-compatibles, 9370, 370, 4300, 3080	CMS	CICS, Shadow	DL/1, VSAM, IMS, SQL, DB2	Yes	NA	Yes	Yes	Yes	Yes	No	NA	Yes	Yes	\$29,950-\$34,950
	Guest/APT	DOS/VSE, MVS (VM/CMS in first-quarter '88)	IBM and plug-compatibles, 9370, 370, 4300, 3080	CMS	CICS, Shadow	DL/1, VSAM, IMS, SQL, DB2	Yes	NA	Yes	Yes	Yes	No	Yes	NA	Yes	Yes	\$15,950-\$19,950
Aion Corp. (415) 328-9595	Aion Development System, Aion Execution System	MVS/SP, MVS/XA, VM/SP, VM/HPO, VM/XA, PC-DOS	CPUs supporting IBM 370 architecture, including 9370, 4300, 3080, 3090, PC XT, AT, PS/2	MVS/TSO, CICS, IMS/DC, VM/CMS, XT, AT, PS/2	MVS/TSO, CICS, IMS/DC, VM/CMS, XT, AT, PS/2	DL/1, DB2, SQL/DS, VSAM, QSAM, Dbase III, Rbase, 1-2-3	Yes	NA	Yes	Yes	Yes	Yes	No	None	Yes	Yes	\$750-\$70,000
Alphasoft, Inc. (213) 212-7477	First	EDX	Series/1	EDX with EDL	EDX with EDL	Proprietary	Yes	NA	Yes	No	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$14,000
American Management Systems, Inc. (703) 841-6060	Life Cycle Productivity System	MVS	IBM PC and compatibles, IBM mainframes	TSO	CICS, IMS/DC, IDMS/DC	IMS, IDMS, Adabase, Datacom/DB, DB2, VSAM	No	Via JCL	Yes	No	Yes	Yes, CICS only	No	IMS, IDMS, Datamanager, others	No	Yes	\$175,000-\$275,000
Applied Data Research, Inc. (201) 874-9000	ADR/Ideal	MVS, VSE, VM/CMS	IBM 370 and up, 9370 Release 2	CICS, CMS	CICS, CMS	Datacom/DB, DB2	Yes	NA	Yes	Yes	Yes	No	Yes	Datacom/DB	Yes	Yes	Contact vendor
AT&T (800) 247-1212	Sourcewriter	DOS, Unix System V	AT&T 3B2/310, 3B2/400, 3B2/600, 3B15	AT&T 3B2/310, 3B2/400, 3B2/600, 3B15, AT&T PC 6300, PC 6300 Plus	AT&T 3B2/310, 3B2/400, 3B2/600, 3B15, AT&T PC 6300, PC 6300 Plus	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$2,000-\$3,500
BBJ Computers International (408) 249-9900	Today	VMS, Unix, Xenix, MPE, Primos	DEC, HP, Prime, Unix, IBM	Hardware-dependent	Hardware-dependent	RDB, Oracle, Unify, Image, Turbo-Image	Yes	NA	Yes	Yes	Yes	Yes	Yes	Operating system-dependent	Yes	Yes	\$950-\$70,000
Business Computer Solutions, Inc. (305) 591-2274	Z-Four	Unix, Xenix, VS	Unix System V, VS minis	Proprietary	Proprietary	Proprietary, CI/SAM, Wang DMS	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$2,000-\$150,000
Bytel Corp. (415) 527-1157	Cogen	PC-DOS, MS-DOS, Unix, NCR	IBM PC, XT, AT and compatibles, Unix machines, NCR 9000	Cobol	Cobol	None	No	Via source code	NA	NA	Yes	No	Yes	None	Yes	Yes	\$450-\$3,650
	Genifer	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	NA	Dbase	Dbase and compatibles	No	Via source code	NA	NA	Yes	No	Yes	None	Yes	Yes	\$395
Century Analysis, Inc. (415) 680-7800	Star	VRX, VRX/E	NCR 8500, 8600, 8800, 9800	Interactive, with transaction processing monitor	Interactive, with transaction processing monitor	Mbase/9, Total	Yes	NA	Yes	—	Yes	Yes	Yes	Mbase/9	Yes	Yes	\$20,000-\$100,000
CGI Systems, Inc. (800) PAC-1866	Pacbase	OS, DOS, MVS, IMS, GCOS, GCOS 8, OS/1100	IBM, Honeywell Bull, Unisys mainframes	IMS	Application-dependent	DB2, DL/1, IDMS, IDS/2, DMS 1100	No	Via host CPU compiler	Yes	No	No	No	Yes	Proprietary dictionary	Yes	Yes	\$150,000-\$400,000
Cincom Systems, Inc. (513) 662-2300	Mantis	MVS/SP, MVS/XA, DOS/VSE, VM/CSP, VAX/VMS, VRX, VS, GCOS	IBM 370 and compatibles, VAX, NCR 8500, 8800, 9800, DPS 7, VS	IMS/DC, CICS, VM/CMS	IMS/DC, CICS, VM/CMS	IMS/DB, DL/1, VSAM, PC File, Supra, IDMS, Datacom/DB, Adabas	Yes	NA	Yes	Yes	Yes	Yes	Yes	User-defined	Yes	Yes	\$15,000-\$125,000
Cognos, Inc. (800) 4-COGNOS	Powerhouse	Hardware-dependent	HP 3000, VAX, Eclipse/MV, IBM PC AT and compatibles	Hardware-dependent	Hardware-dependent	Hardware-dependent	Yes	NA	Yes	Yes	Yes	Yes	Yes	Hardware-dependent	No	Yes	Contact vendor
Compuserve Data Technologies (617) 661-9440	System 1032/AF	VAX/VMS	VAX	VAX/VMS	VAX/VMS	Proprietary	Yes	NA	Yes	No	Yes	Yes	Yes	Proprietary	Yes	Yes	\$3,000-\$24,000
Computer Corporation of America (617) 492-8860	Accolade	MVS, DOS/VSE, DOS, MVT, PC-DOS, MS-DOS	IBM 4341 and up and compatibles, PC XT, AT and compatibles	CICS, MS-DOS	CICS, MS-DOS	IMS, Datacom/DB, DB2, Model 204, VSAM, ISAM	No	Via compiler	Yes	Yes	Yes	Yes	Yes	VSAM, IMS, Model 204	Yes	Yes	\$65,000 or \$125,000
Cortex Corp. (617) 894-7000	Application Factory	VAX/VMS	VAX	VAX	VAX/VMS	RDB, ISAM	Yes	NA	Yes	No	Yes	Yes	Yes	DEC Common Data Dictionary	Yes	Yes	\$42,000-\$150,000
	Corvision	VAX/VMS, MS-DOS	IBM PC AT	VAX, MS-DOS	VAX/VMS	RDB, ISAM	Yes	NA	Yes	No	Yes	Yes	Yes	DEC Common Data Dictionary	Yes	Yes	\$50,000

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from the vendors.

COMPANY	PRODUCT	OPERATING SYSTEM	RUNS ON	DEVELOPMENT ENVIRONMENT SUPPORTED	EXECUTION ENVIRONMENT SUPPORTED	DBMS SUPPORTED	BUILT-IN COMPILER OR INTERPRETER CAPABILITY	POINT OF CONNECTION TO COMPILER OR INTERPRETER	SUPPORTS ON-LINE VOLUME APPLICATIONS	SUPPORTS REAL-TIME APPLICATIONS	INCLUDES TEST AIDS	INCLUDES DEBUGGING FACILITIES	INCLUDES A DATA DICTIONARY	DATA DICTIONARY INTERFACES	INCLUDES EDITOR	INCLUDES SCREEN PAINTER	PRICE
Cosmos, Inc. (206) 643-9898	Advanced Revelation	MS-DOS, PC-DOS	IBM PC AT and compatibles	DOS	DOS	Proprietary	—	—	—	—	—	—	Yes	Proprietary	—	Yes	\$950
CRI Computer Representatives, Inc. (408) 980-9898	Relate/DB	AOS/VS, VMS, MPE, Aegis	MV, VAX, HP 3000, Rolm, Apollo workstations	Hardware-dependent	Hardware-dependent	Relate	Yes	NA	Yes	Yes	Yes	Yes	No	Proprietary dictionary (for HP 3000)	No	Yes	Contact vendor
Cullinet Software, Inc. (617) 329-7700	Knowledgebuild	VAX/VMS	VAX	VAX/VMS	VAX/VMS	IDMS/SQL, RMS	Yes	NA	Yes	Yes	Yes	Yes	Yes	IDMS/SQL	Yes	Yes	\$2,000-\$80,000
	ADS/Online, ADS/Batch	MVS, MVS/XA, VM/CMS, DOS/VSE, DOS/VSE/SP, BS2000	IBM 370, 3000, 4300, 9370 and compatibles, Siemens 7500, 7700	Hardware-dependent	Hardware-dependent	IDMS/R	Yes	NA	Yes	Yes	Yes	Yes	Yes	Cullinet Integrated Data Dictionary	Yes	Yes	\$12,000-\$60,000
Data Language Corp. (617) 663-5000	Progress	MS-DOS, VAX/VMS, Unix, Xenix, Ultrix, CTOS/BTOS	125 platforms	Proprietary	Proprietary	Progress	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$1,000-\$125,000
Datatron, Inc. (312) 993-0065	Datatron	PC-DOS, OS/DOS	IBM PC and compatibles, 370 and up	CICS, TSO, ICCF	CICS, TSO, ICCF	VSAM or sequential files	Yes	NA	Yes	Yes	Yes	Yes	—	Any	Yes	Yes	\$395-\$17,000
Decision Point, Inc. (516) 328-7000	Pro-2	MVS, VSE, OS, VOS	IBM machines running CICS	CICS	CICS	VSAM, DL/1	Yes	Via JCL	Yes	Yes	Yes	Yes	No	Any	NA	Yes	\$19,500-\$29,500
Digital Equipment Corp. Contact local sales office	VAX Cobol Generator	VAX/VMS	VAX	VMS	VMS	—	—	—	—	—	—	—	—	—	—	—	Contact vendor
ESI (904) 575-0179	Group Four	MCP, MCP/VS, MCP/AS	Unisys (Burroughs) mainframes	Unisys (Burroughs) mainframes, IBM PC	Unisys (Burroughs) mainframes, IBM PC	DMS/II, Unisys (Burroughs) proprietary, ISAM, user-defined	No	Via compiler level	Yes	Yes	No	Yes	Yes	Any	No	Yes	\$144,000
Execucom Systems Corp. (512) 346-4980	IFPS/Plus	MVS/TSO, VM/CMS, VAX/VMS, Primos, Unisys operating system	VAX, IBM 9370 and above, Unisys A series, Prime systems running Primos	IFPS/Plus	IFPS/Plus	Proprietary	Yes	NA	Yes	No	Yes	Yes	No	No	Yes	Yes	\$5,000-\$85,000
	IFPS/Personal	MS-DOS, PC-DOS	IBM PCs and compatibles	IFPS/Personal	IFPS/Personal	None	Yes	NA	No	No	No	Yes	No	No	Yes	No	\$895
Expert Systems International (215) 735-8510	Prolog	MS-DOS, VAX/VMS	IBM PC, XT, AT and compatibles, VAX	Operating system-dependent	Operating system-dependent	—	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$145-\$1,495 (PCs); \$5,000-\$20,000 (DEC)
Goal Systems International, Inc. (800) 848-4640	Classic/AL	VSE, MVS	IBM 3000, 4300	CICS	Machine code	DL/1, IMS, Total, Datacom/DB, others	Yes	NA	Yes	—	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$35,000-\$44,800
Help/38 Systems, Inc. (612) 933-0609	Genesis V	CPF	System/38	CPF	CPF	Proprietary	Yes	NA	Yes	Yes	No	No	Yes	Proprietary	No	Yes	\$14,950
Henco Software, Inc. (617) 890-8670	Info-DB Plus	VMS	VAX	VMS	VMS	Proprietary	Yes	NA	Yes	No	No	No	Yes	DEC Common Data Dictionary	Yes	Yes	\$45,000-\$165,000
Honeywell Bull, Inc. Contact local sales office	System/80	GCOS 6, MOD 400 3.1, 4.0 Plus, HVS 6 Plus, GCOS 8	DPS 6/22 and up	GCOS 6, HVS 6 Plus, GCOS 8	GCOS 6, HVS 6 Plus, GCOS 8	UFAS files	No	Via operating system	Yes	Yes	Yes	No	Yes	Proprietary	No	No	\$5,225-\$9,500
	Integrated Query System	GCOS 7	DPS 7000, DPS 7, L64	Interactive operator facility	Interactive operator facility	IDS II, UFAS files	Yes	NA	Yes	Yes	Optional	No	Yes	Proprietary	Yes	Yes	\$300 (per month leased)
	Oracle	HVS 6 Plus	DPS 6 Plus	HVS 6 Plus, products supporting Oracle	—	—	—	—	—	—	—	—	—	—	—	—	—
IBM Contact local sales office	Cross System Product	CICS/VS, MVS/TSO, MVS/XA/TSO, VM/SP/CMS	IBM 4300, 9370 3000	CSP/AD	CSP/AE	DB2, SQL/DS	—	—	—	—	—	—	—	—	—	—	Contact vendor
Information Builders, Inc. (212) 736-4433	Focus	VM, CMS, VAX/VMS, VS, Unix, MS-DOS, PC-DOS	VAX, IBM PC, XT, AT, PS/2 and compatibles, 370, VS	—	—	Any	Yes	NA	Yes	Yes	Yes	Yes	Yes	Any	Yes	Yes	\$1,295-\$100,000
Informix Software, Inc. (415) 322-4100	Informix-4GL	DOS, VMS, Unix	Most major brands	DOS, VMS, Unix	DOS, VMS, Unix	—	No	4GL compiled into code	Yes	Yes	No	No	Yes	Proprietary dictionary	Yes	Yes	\$995-\$90,000
Intelligent Information Systems (212) 966-4468	IIS/Destiny	VAX/VMS	VAX	—	—	Any	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$15,000-\$50,000
Interbase Software Corp. (617) 649-3977	Interbase	VMS, Ultrix, Aegis, Domain/IX, SunOS	VAX, Apollo, Sun	NA	NA	Interbase, RDB	Yes	NA	Yes	Yes	No-cost option	No-cost option	Yes	Proprietary, DEC RDB Dictionary	No	Yes	\$5,000-\$75,000
ISI Systems, Inc. (800) 255-1580	Ratabase	PC-DOS, OS/VS2, MVS	IBM PC, XT, AT, 3090, 3080, 3090	Micro workstation	IMS, VSAM batch, IBM PC	IMS, VSAM	NA	NA	Yes	Yes	Yes	Yes	No	NA	No	No	Contact vendor
JYACC, Inc. (212) 267-7722	JAM	MS-DOS, Unix, Ultrix, RMX, VMS, HP-UX, OSX, VOS, AIX	IBM PC and compatibles, Sun, Intel 310, Cubix 286, Apollo, AT&T 3B, HP 9000, Tower, Stratus, Gould, Pyramid, Unisys, Masscomp	Operating system-dependent	Operating system-dependent	Any	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	No	Yes	\$750-\$6,750

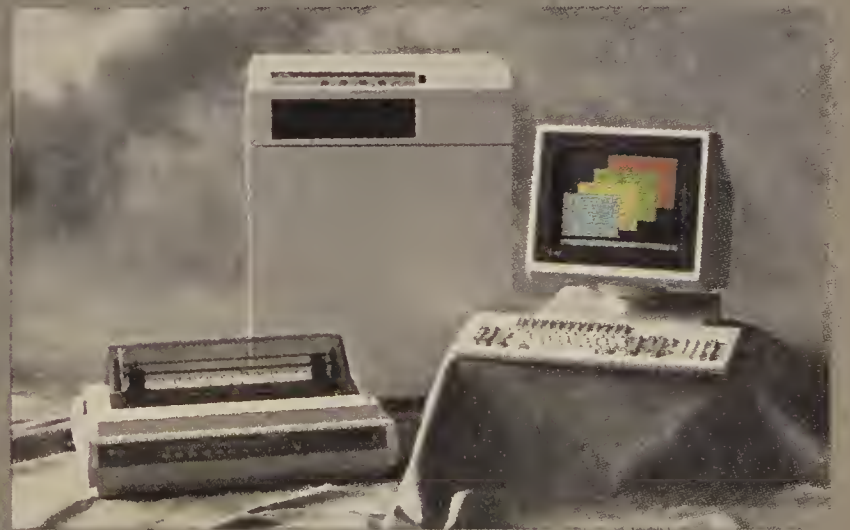
COMPANY	PRODUCT	OPERATING SYSTEM	RUNS ON	DEVELOPMENT ENVIRONMENT SUPPORTED	EXECUTION ENVIRONMENT SUPPORTED	DBMS SUPPORTED	BUILT-IN COMPILER OR INTERPRETER CAPABILITY	POINT OF CONNECTION TO COMPILER OR INTERPRETER	SUPPORTS ON-LINE VOLUME APPLICATIONS	SUPPORTS REAL-TIME APPLICATIONS	INCLUDES TEST AIDS	INCLUDES DEBUGGING FACILITIES	INCLUDES A DATA DICTIONARY	DATA DICTIONARY INTERFACES	INCLUDES EDITOR	INCLUDES SCREEN PAINTER	PRICE
Knowledgeware, Inc. (404) 231-8575	Gamma	MVS, MVS/XA, VM, DOS/VSE	IBM and compatibles, 4341 Release 2	CICS, TSO/ISPF, CMS/ISPF	DOS/VSE, MVS/XA, CICS	VSAM, DL/1, IDMS, IDMS/R, DB2, IMS DB/DC	No	Via host CPU Cobol compiler	Yes	No	Ltd.	Ltd.	Yes	IMS	Yes	Yes	\$182,000
Landmark Software Systems, Inc. (201) 722-5100	X-ample	VMS	VAX	VMS, X-ample	VMS, X-ample	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$20,000-\$75,000
Linkware (617) 894-9330	PC Connection	MS-DOS, PC-DOS	IBM PC and compatibles	DOS, any language that can call a DOS function	DOS	None	No	NA	Yes	Yes	NA	NA	No	None	No	No	\$195
	Contact	MS-DOS, PC-DOS	IBM PC and compatibles	DOS, any language that can call a DOS function	DOS	NA	Yes	NA	Yes	Yes	Yes	Yes	No	None	No	Yes	\$175
Magic Software (800) DD-MAGIC	Magic Application Development System	PC-DOS, VM/CMS, VAX/VMS	IBM 370 architecture with DOS or MVS	IMS	CICS	SQL, DB2, DL/1, Supra, Datacom/DB, others	No	Via IBM compiler	Yes	Yes	Yes	Yes	Yes	Any	Yes	Yes	\$40,000-\$150,000 (mainframe)
Magna Software Corp. (516) 944-5180	Magna	Cyber under NOS/B, NOS/V	CDC mainframes	Proprietary	Proprietary	—	No	Via Cobol on host CPU	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	No	\$48,500-\$104,500
	Magna 8	GCOS 8	DPS8, DP88, DP90	Proprietary	Proprietary	IDS/2	No	Via compiler on host	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$60,000-\$120,000
Manager Software Products, Inc. (617) 863-5800	Sourcemanager Version .02	MVS, MVS/XA, VM	IBM 4300, 3080, 370, 9370 and compatibles	TSO, CMS	TSO, CMS	IMS, DL/1	—	—	Yes	—	No	Yes	Yes	Proprietary dictionary	Yes	Yes	\$45,000-\$100,000
McCormack & Dodge Corp. (800) 343-0325	Millennium:SDT	OS/DOS	IBM 370, 4300, 3000	Millennium/CICS, Millennium IMS/DC	Millennium/CICS, Millennium IMS/DC	IMS, DB2	Yes	NA	Yes	Yes	No	No	Yes	Proprietary dictionary	Yes	Yes	\$75,000-\$110,000
MB & Associates (303) 794-1740	Adaquick	DOS, VMS	IBM mainframes and compatibles	Natural	CICS, TSO, batch or complete	Adabas, VSAM, DL/1, DB2	Yes	NA	Yes	Yes	No	No	No	Predict	Yes	No	\$10,000
McDonnell Douglas Information Systems Group (714) 250-1000	All	Reality/Pick	IBM PC, XT, AT, McDonnell Douglas 6000, 9000, Series 18	Pick/Reality	Pick/Reality	Pick/Reality	Yes	NA	Yes	Yes	Yes	Yes	Yes	Pick/Reality	Yes	Yes	\$1,000-\$25,000
Micro Focus, Inc. (415) 856-4161	Sourcewriter	PC-DOS, Unix, CP/M 86, Concurrent DOS	IBM PC and compatibles, IBM PS/2, Unix-based systems including Tower	—	—	—	No	Generates source code	Yes	Yes	No	No	Yes	Proprietary dictionary	No	Yes	Contact vendor
Microfinancial Corp. (818) 961-0237	Flexware Development System	MS-DOS, VAX/VMS, Macintosh	IBM PC and compatibles, Macintosh, Mac II, VAX	Proprietary	Native environment, UCSDP systems	Proprietary B-tree, import/export via ASCII file	Yes	NA	Yes	Yes	Yes	Yes	Yes	None	Yes	Yes	\$995-\$2,795
Micro Focus, Inc. (415) 856-4161	Sourcewriter	PC-DOS, Unix, CP/M 86, Concurrent DOS	IBM PC and compatibles, PS/2, Tower, AT&T Unix systems	—	—	—	Optional	NA	Yes	Yes	No	No	Yes	Proprietary	No	Yes	\$1,000-\$2,500
Millsoft, Inc. (714) 955-3017	System Builder	Pick, MS-DOS, Unix	Systems running Unix, Pick, MS-DOS	Software-dependent	Software-dependent	Revelation, Universe, Pick	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$695-\$50,000
Mitrol, Inc. (617) 933-9545	Mitrol	VM, MVS	IBM 370 architecture	VM, CMS, TSO	Integrated transaction processing monitor, DBMS	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$50,000-\$150,000
Multisoft, Inc. (609) 896-4100	Super-Link	MVS, DOS, VAX/VMS, CMS, TSO	IBM 370, VAX	MS-DOS	MS-DOS, CICS, TSO, CMS, IDMS/DC	Any	Yes	NA	Yes	Yes	Yes	Yes	No	None	No	Yes	\$25,000-\$60,000
Must Software International (203) 762-2515	Nomad2	MVS, VM	IBM 9370 and up, compatibles	CMS, TSO	CMS, VM/CMS batch, MVS batch, TSO batch, native VTAM	Nomad2, SQL/DS, DB2, IDMS/R, Teradata, IMS	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary, IDMS/R, SQL/DS, DB2, Teradata	Yes	Yes	\$42,000-\$120,000
	PC Nomad	MS-DOS, PC-DOS	IBM PCs and compatibles	MS-DOS, PC-DOS	MS-DOS, PC-DOS	PC Nomad, Dbase III	Yes	NA	Yes	Yes	Yes	Yes	—	—	Yes	Yes	\$795
National Information Systems, Inc. (408) 985-7100	Accent R	VMS, TOPS 10, TOPS 20	VAX, Decnet 10, Decnet 20	VAX Codasyl	VMS	RMS file on VAX	Yes	NA	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	\$4,000-\$99,500
Netron, Inc. (416) 636-8333	Netron/CAP Development Center	VM/CMS, MVS/IMS, DOS/IMS, MVS/CICS, DOS/CICS, MS-DOS, VAX/VMS, VS	IBM 3000, 4300, 9370, VS, VAX, IBM PC and compatibles	Hardware-dependent	Hardware-dependent	IMS/DB, DB2/SQL, System 2000, Teradata, VS, Pace, VAX DBMS, data bases accessible by Cobol	Yes	NA	Yes	Yes	Yes	Yes	No	Any that accept Cobol interface	Yes	Yes	Contact vendor
On-Line Business Systems, Inc. (415) 391-9555	Qwik/CICS	MVS, VSI, VSE	IBM 4300, 3080	CICS, TSO, Roscoe	CICS, CICS/MRO	DL/1, Datacom/DB	No	Via Cobol compiler	Yes	Yes	Yes	Yes	No	None	No	No	\$19,500 or \$32,000
On-Line Software International, Inc. (201) 592-0009	Cobol/XE	VM/CMS, DOS/VSE, MVS/OS, MVS/XA	IBM 9370, 4300, 3090, XT/370, AT/370	CICS, TSO, VM/CMS, VM/PC	CICS, TSO, VM/CMS, VM/PC	Any	Yes	NA	Yes	Yes	No	Yes	No	None	No	Yes	\$7,500-\$25,000



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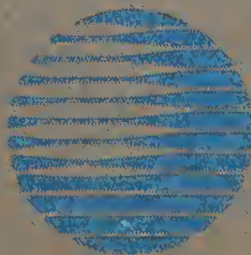
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COMPANY	PRODUCT	OPERATING SYSTEM	RUNS ON	DEVELOPMENT ENVIRONMENT SUPPORTED	EXECUTION ENVIRONMENT SUPPORTED	DBMS SUPPORTED	BUILT-IN COMPILER OR INTERPRETER CAPABILITY	POINT OF CONNECTION TO COMPILER OR INTERPRETER	SUPPORTS ON-LINE VOLUME APPLICATIONS	SUPPORTS REAL-TIME APPLICATIONS	INCLUDES TEST AIDS	INCLUDES DEBUGGING FACILITIES	INCLUDES A DATA DICTIONARY	DATA DICTIONARY INTERFACES	INCLUDES EDITOR	INCLUDES SCREEN PAINTER	PRICE
On-Line Software International, Inc. (201) 592-0009	Intelagen	MVS	IBM 9370, 4300, 3090	CICS	CICS, IMS/DC, IDMS/DC, batch	VSAM, IMS/DD, DL/1, IDMS/R	No	Via source code generator	Yes	Yes	No	No	Yes	Proprietary dictionary	Yes	Yes	\$80,000
	UFO Productivity System	VM/CMS, DOS/VSE, MVS/OS, MVS/XA	IBM 9370, 4300, 3090, XT/370, AT/370	CICS, TSO, VM/CMS, VM/PC, MS/DC	CICS, TSO, VM/CMS, VM/PC, MS/DC	VSAM, DL/1, DB2, SQL/DS, IMS/DB, Total	Yes	NA	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	\$30,000-\$45,000
	Ramis	MVS, CMS, DOS	IBM	—	—	Any	—	—	Yes	Yes	Yes	Yes	Yes	Any	—	—	Contact vendor
Oracle Corp. (800) ORACLE-1	SQL Forms	VAX/VMS, MS-DOS, Unix, VM/CMS, MVS, AOS, DG-UX	IBM 4300, 3080, 370, PC AT, MV, PS/2, (Models 50, 60, 80), Compaq 386, VAX, HP 9000, Altos, Pyramid, Sequent, Unisys	Hardware-dependent	Hardware-dependent	Oracle, DB2, SQL/DS	Yes	NA	Yes	Yes	No	Yes	Yes	Oracle	Yes	Yes	Contact vendor
Pansophic Systems, Inc. (312) 572-6000	Telon	MVS/XA	IBM 4300, 3080, 3090	TSO, CICS, VM/CMS	CICS, IMS/DC	DB2, IMS, VSAM	No	NA	Yes	Yes	Yes	Yes	No	Any	Yes	Yes	\$130,000-\$285,000
Peregrine Systems, Inc. (714) 855-3923	Peregrine Four	MVS, Unix	IBM 3000, 4300, 9370, 370 and compatibles, Unix-based systems	Proprietary	Proprietary	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	Contact vendor
Phoenix Software Co. (213) 338-0400	Sygnnet	MVS/SP, MVS/XA, DOS/VSE/SP	IBM 4300 and compatibles	CICS, VTAM	CICS, VTAM	DL/1, SQL	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$28,000 or \$38,000
Plexus Computers, Inc. (408) 943-9433	Plexus XDP Development Environment	MS Windows	Plexus XDP System	MS Windows	MS Windows	Proprietary	Yes	NA	Yes	Yes	No	No	Yes	Proprietary	No	Yes	\$2,950
Progeni Systems, Inc. (818) 956-0251	Progeni GLE	MCP	Unisys B1000 through A 15 series	Proprietary	Proprietary	File structures, including DBMS/2	No	Via host CPU	Yes	Yes	Yes	Yes	Yes	Proprietary, any Unisys (Burroughs) standard dictionary	Yes	Yes	\$30,000-\$80,000
	Filetab-D	VAX/VMS, RSTS, RT-11, TSX Plus, Micro RSX, RSX-11M, RSX-11M Plus, Micro RSTS	VAX, PDP	Proprietary	Proprietary	RMS, CDC files, Oracle	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary, Cullinet Common Data Dictionary, most others	Yes	Yes	\$8,000-\$55,000
Rapport Corp. (212) 968-8270	Rapport	VM/CMS, MVS/TSO, VAX/VMS, Primos, GCOS 6, GCOS 8, AOS/VS, Genra 7, HP-UX, MS-DOS, PC-DOS	IBM machines, VAX, DPS, Prime machines, Symbolics, DG, HP 9000	Proprietary, Cobol, Fortran, Pascal, LISP, SQL	Proprietary, Cobol, Fortran, Pascal, LISP, SQL	Proprietary	No	Via host CPU operating system	Yes	Yes	Yes	No	Yes	Proprietary	Yes	Yes	\$1,500-\$120,000
Relational Technology, Inc. (800) 4-INGRES	Ingres	VAX/VMS, Unix, MS-DOS, PC-DOS, Ultrix, VM/CMS	IBM, up to and including 3080, DEC equipment, most Unix environments	Proprietary	Proprietary	Ingres	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary dictionary	Yes	Yes	\$950-\$160,000
Response Technology, Inc. (206) 624-4273	Insyte	Unisys mainframes	Unisys mainframes	Unisys	Unisys	DMS II, any flat file	Yes	NA	—	—	Yes	—	No	None	Yes	Yes	\$15,000-\$44,000
Sage Software, Inc. (800) 638-8703	APS Development Center	MVS, MVS/XA, VM	IBM PC, mainframes and compatibles	IMS, CICS	IMS, CICS	VSAM, DB2, IMS	Yes	NA	Yes	Yes	No	Yes	Yes	DB2, IMS	Yes	Yes	\$3,500-\$200,000
SAS Institute, Inc. (919) 467-8000	SAS System	OS/MVS, CMS, DOS/VSE, VMS, Primos, AOS/VS, PC-DOS	IBM 370, 3000, 4300, 9370 and compatibles, VAX	OS/MVS, CMS, DOS/VSE, VMS, Primos, AOS/VS, PC-DOS	OS/MVS, CMS, DOS/VSE, VMS, Primos, AOS/VS, PC-DOS	System 2000, IMS, SQL/DS, DB2	Yes	NA	Yes	No	Yes	Yes	No	DB2, IMS, SQL/DS	Yes	Yes	\$700-\$12,000
Scientific & Business Systems, Inc. (212) 481-1310	Sourcerer	GCOS	Honeywell DPS 8, DPS 88, DPS 90, DPS 7, DPS 6	DMIV/TP, DM6/TP	GCOS 8, GCOS 7, GCOS 6	IDS2/DMIV, DM6	No	Assembles source programs, calls compiler	Yes	Yes	Yes	No	Yes	Apprentice	Yes	Yes	Up to \$42,000
Signal Technology, Inc. (805) 683-3771	Smartstar	VAX/VMS	VAX, Britton-Lee	RDB, RMS	Smartstar	RDB	No	Via host CPU	No	Yes	No	No	Yes	Proprietary	Yes	Yes	\$55,000
SIR (a division of Inter Systems, Inc.) (312) 480-9270	SIR/DBMS	IBM mainframes except DOS, all DG, VAX/VMS, Cray, NOS, NOS/VE, HP 9000, Primos, Aegis, GCOS, GCOS 8, OS 1100, others	IBM mainframes, DG, Prime, CDC Cyber, VAX, Cray supers, HP 9000, Honeywell Bull, Unisys, Apollo and Sun workstations	Hardware-dependent	Hardware-dependent	Any	Yes	NA	Yes	Yes	Yes	Yes, ltd.	Yes	Proprietary	Yes	Yes	\$1,500-\$120,000
The Small Computer Co. (914) 769-3160	Filepro	MS-DOS, Unix, Xenix	Altos 2086, IBM PC, RT, AT, XT and compatibles, Tandy, Tower 32, Unisys IT and 5000, AT&T 3B2, 3B1, 7300	Resident operating system	Resident operating system	Proprietary, ASCII-based files	Yes	NA	Yes	—	Yes	Yes	No	None	Yes	Yes	\$990-\$1,990
Softool Corp. (805) 683-5777	Change & Configuration Control	MVS, VM/CMS, VAX/VMS, Ultrix, GCOS 8, AOS/VS, MPX, Sun Unix, HCX, MCX	MV, IBM, VAX, Honeywell Bull, Gould, Sun, Harris	Proprietary	Proprietary	Proprietary	No	Via host compiler	Yes	Yes	Yes	NA	NA	NA	Yes	Yes	\$3,500-\$50,000
	The Fortran Programming Environment	MVS, VM/CMS, VAX/VMS, Ultrix, AOS/VS, MPX	DG MV, IBM, VAX, Gould	Proprietary	Proprietary	NA	No	Via host compiler	Yes	Yes	Yes	NA	NA	NA	NA	NA	\$3,500-\$50,000

COMPANY	PRODUCT	OPERATING SYSTEM	RUNS ON	DEVELOPMENT ENVIRONMENT SUPPORTED	EXECUTION ENVIRONMENT SUPPORTED	DBMS SUPPORTED	BUILT-IN COMPILER OR INTERPRETER CAPABILITY	POINT OF CONNECTION TO COMPILER OR INTERPRETER	SUPPORTS ON-LINE VOLUME APPLICATIONS	SUPPORTS REAL-TIME APPLICATIONS	INCLUDES TEST AIDS	INCLUDES DEBUGGING FACILITIES	INCLUDES A DATA DICTIONARY	DATA DICTIONARY INTERFACES	INCLUDES EDITOR	INCLUDES SCREEN PAINTER	PRICE
Softool Corp. (805) 683-5777	The Cobol Programming Environment	VAX/VMS, Ultrix, GCOS 8, MPX	VAX, Honeywell Bull, Gould	Proprietary	Proprietary	NA	No	Via host compiler	Yes	Yes	Yes	NA	NA	NA	NA	NA	\$10,000-\$33,500
Software AG of North America, Inc. (703) 860-5050	Natural	MVS, MVS/XA, DOS/VSE, VM/CMS, VAX/VMS	IBM 370, 9370, VAX	CICS, TSO, IMS/DC, Complete, VMS	CICS, TSO, IMS/DC, Complete, VMS	Adabase, DB2, SQL/DS, IMS/DB, DL/1, VSAM	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$25,000-\$140,000
Software Express, Inc. (713) 974-2298	Appgen	Xenix, Unix	AT&T 3B, Convergent Technologies, Tower, Unisys 5000, IBM RT PC, Harris HX	Unix	Unix	Proprietary	Yes	NA	Yes	No	No	Yes	Yes	Proprietary	No	No	From \$3,000
The Software Group, Inc. (518) 877-8600	Enable	PC-DOS, MS-DOS 3.1	IBM PC and compatibles	MS-DOS	MS-DOS	Dbase II, III, Condor 3, PC File III, 1-2-3	NA	NA	No	No	Yes	No	No	None	Yes	Yes	\$695
Southware Innovations, Inc. (205) 821-1108	Swiftgen	DOS, Unix, Xenix	IBM PC and compatibles, Unix systems	Ryan-McFarland Cobol	Ryan-McFarland Cobol	ISAM	No	Via host compiler	NA	Yes	Yes	No	Yes	Proprietary	No	Yes	\$2,500-\$7,500
Sterling Software, Answer Systems Division (818) 716-1616	Answer/DB	MVS, DOS/VSE	IBM 370, 4300, 3080, 9300	TSO, CICS, IMS/DC	TSO, CICS, IMS/DC	Any	Yes	NA	Yes	Yes	No	No	Yes	—	Yes	—	\$30,000-\$60,000
	Mark IV	MVS, DOS/VSE, CMS	IBM 370, 4300, 3080, 9300	TSO, CMS	IMS/DC, batch	Any	Yes	NA	Yes	No	Yes	Yes	Yes	—	Yes	—	\$40,000-\$120,000
	Mark V	MVS, DOS/VSE	IBM 370, 4300, 3080, 9300	TSO	IMS/DC, CICS	IMS, DB2, VSAM	Yes	NA	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	\$30,000-\$100,000
System Automation Software, Inc. (301) 565-8080	Request	CTOS, BTOS	Convergent Technologies equipment on CTOS	CTOS, BTOS	ISAM	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	\$1,495
Thorn EMI (617) 256-3900	FCS	AOS, AOS/VS, GCOS, MPE Releases 4 and 5, CICS, CMS, TSO, DOS, VMS, VS	MV/Eclipse, DPS 8, HP 3000, IBM 3000, 360, 370, 4300, PC, XT, AT, VAX	Hardware-dependent	Hardware-dependent	SQL, DB2, IDMS, Focus, Adabas	Yes	NA	Yes	Yes	Yes	Yes	No	SQL, DB2, IDMS, Focus, Adabas	Yes	Yes	\$1,200-\$20,000
Concept Omega Corp. Thoroughbred division (800) 524-0430	Idol II, Script IV	Unix, Xenix, VAX/VMS, MS-DOS, Thoroughbred operating system	Unix, Xenix, VAX/VMS, MS-DOS, IBM PC, XT, AT, PS/2 and compatibles	Thoroughbred Basic, Thoroughbred operating system	Thoroughbred Basic, Thoroughbred operating system	Proprietary	Yes	NA	Yes	No	Yes	Yes	Yes	Proprietary	Yes	Yes	\$795-\$3,895
Tom Software, Inc. (206) 246-7022	Speed II	VS	VS minicomputer line	—	—	Proprietary	Yes	NA	—	Yes	Yes	Yes	Yes	Proprietary	Yes	Yes	Contact vendor
Tominy, Inc. (513) 984-6605	Mach 1	DOS/VSE, MVS, EDX, SSP, Unix, VAX/VMS, AOS, Xenix, MS-DOS, PC-DOS	IBM PC, mainframes and compatibles, Tower, VAX, MV, DG desktops	Any	Any	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	No	None	Yes	Yes	\$400-\$75,000
Transform Logic Corp. (602) 948-2600	Transform	MVS, MVS/XA	IBM 4300, 3000, 370, some 9370s	IMS/DC, CICS	IMS/DC, CICS	IMS/DB, DB2	No	Via host CPU compiler	Yes	No	Yes	Yes	Yes	Proprietary	Yes	Yes	\$149,000-\$250,000
The Ultimate Corp. (201) 887-9222	Ultikit	Pick	IBM 370 architecture, VAX, DPS 6, Tandem	Pick	Pick	Pick	No	Via Pick operating system	Yes	Yes	Yes	Yes	Yes	Proprietary Pick	Yes	Yes	From \$500
Unicorn Systems Co. (213) 380-6974	VM CICS/DS	VM	IBM 9370 and up	CICS	CICS	None	Yes	NA	No	Yes	Yes	Yes	No	None	Yes	Yes	\$12,000-\$40,000
Unify Corp. (916) 920-9092	Accell Integrated Development System	Unix, DOS	PC, Unix machines	Accell Development Environment	Accell Runtime Environment	Proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Proprietary	No	Yes	\$2,995-\$120,000
Unipress Software, Inc. (201) 985-8000	Unipress ZIM	MS-DOS, Netware, Unix, Xenix, Qnix, VMS, VM/CMS	Any	Hardware-dependent	Hardware-dependent	Proprietary	Yes	NA	Yes	Yes	No	Yes	Yes	Proprietary	Yes	Yes	\$1,080-\$26,000
Unisys Corp. (313) 972-9310	Linc	MCP, Centix/BTOS	Unisys A, B and V series, 5000/70	Linc under MCP, Centix/BTOS	MCP, Centix/BTOS	DMS II, DCS	Yes	NA	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	\$8,000-\$250,000
	The Mapper System	Unisys 1100, Unix, MS-DOS, PC-DOS	Unisys 1100, 2200, 5000, 7000, Unisys PC, IBM PC	No runtime version	No runtime version	Internal relational, Oracle, RDMS 1100	Yes	NA	Yes	Yes	Yes	Yes	Optional	—	Yes	Yes	\$2,395-\$99,000
	The Ally System	Unix, MS-DOS, PC-DOS	Unisys 5000, 7000, PC IT, Micro/IT, IBM PC AT	Unix System V.2	Unix System V.2	Oracle, Dbase III, proprietary	Yes	NA	Yes	Yes	Yes	Yes	Yes	Oracle, Dbase III	Yes	Yes	\$200-\$32,000
Userware International (619) 745-6006	Userbase	VMS	VAX	VMS, LSE	VMS, All-In-1	Proprietary, RMS	Yes	NA	Yes	No	Yes	Yes	Yes	Proprietary	Yes	Yes	\$4,000-\$48,000
	User-II	RSTS/E	PDP-11	RSTS/E	RSTS/E	Proprietary	Yes	NA	Yes	No	Yes	Yes	Yes	Proprietary	Yes	No	\$4,000-\$6,000
	Gemini	VMS	VAX	VMS	VMS	DEC RDB	Yes	NA	Yes	No	Yes	Yes	Yes	RDB	Yes	Yes	\$15,000-\$90,000
VM Personal Computing, Inc. (203) 798-3800	Beyond.Bat	MS-DOS 2.0 and up	IBM PC and compatibles	MS-DOS	MS-DOS	None	No	Via operating system	No	Yes	Yes	Yes	No	None	Yes	Yes	\$99.00
Wang Laboratories, Inc. (800) 522-9264	Professional Application Creation Environment (PACE)	VS 7.10 or greater	VS (except VS 80)	VS	VS	Proprietary, relational	Yes	NA	Yes	Yes	Yes	No	Yes	Proprietary	Yes	Yes	\$13,000-\$39,000
Westmoreland Software International, Inc. (305) 260-5858	The ADD System	SSP	System/34, System/36	SSP	None	None	Yes	NA	Yes	Yes	Yes	Optional	Yes	Proprietary, IDDU, others	Yes	Yes	\$3,600
XRT, Inc. (215) 254-0300	APG	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	DOS	DOS	Proprietary	Yes	NA	Yes	Yes	No	Yes	Yes	Proprietary, Tandem Encscribe	Yes	Yes	\$495-\$5,000

CASE tools

American Management Systems, Inc.

(703) 841-6060

Life-Cycle Productivity System

An integrated set of system productivity tools, including strategic system planning, design, implementation, maintenance and project management. Implementation, configuration control and foundation software functions operate on IBM mainframes. Most portions of the product run on IBM Personal Computers with or without local-area networks.

Applied Data Research, Inc.

(201) 874-9000

Depictor

Supports analysis and design of data bases and applications, working both on mainframes and personal computers to produce an integrated, graphics-based system. Using definitions obtained from the mainframe data dictionary, the product's PC component displays, maintains and updates the mainframe information. Mainframe component operates in standard ADR Datacom/DB environments under IBM's VSE, VM/CMS, MVS and MVS/XA.

Arthur Andersen & Co.

(312) 580-0069

Foundation

For design, implementation and support of transaction processing applications running in IBM's DB2 environment. Allows interaction among planners, designers, programmers and analysts throughout the development life cycle. Includes a design dictionary, an implementation dictionary based on DB2 and a layered processing architecture.

Caseware, Inc.

(714) 754-0308

Amplify Control

A formal system for sharing information between separate, interdependent tasks in the software development process. Each task is accessed through a uniform graphics interface. Includes a version-control and a software-control facility and a version file translator. Single or multi-user application runs on Sun Microsystems, Inc. Sun-2 or Sun-3 workstations.

Catalytix Corp.

(617) 497-2160

Safe C Interpreter

Used in designing, prototyping, coding, integrating and maintaining C programs. Includes automatic error detection and debugging facilities. Runs on most Unix machines and in the Digital Equipment Corp. VAX/VMS environment.

Safe C Runtime Analyzer

Provides runtime checking facilities, memory monitor, profiling and tracer capabilities in a Unix or Digital Equipment Corp. VAX/VMS environment.

CGI Systems, Inc.

(914) 735-5030

Pacbase

A full life cycle computer-aided software engineering product based on an enterprise model. All life cycle functions are integrated and automated. Uses dictionary-driven approach of data base systems. Product is portable and runs on IBM, Honeywell Bull, Inc. and Unisys Corp. systems.

Pacbase Workstation Series

Allows project team members to create, maintain and query information in the Pacbase Specifications Dictionary for analysis by IBM Personal Computer tools. Runs on IBM PC XT or ATs. Requires a Digital Communications Associates, Inc. 3270 Irmaboard and a minimum of 512K bytes of random-access memory.

Cortex Corp.

(617) 894-7000

Corvision

Automates most of the application software life cycle by transparently linking design diagramming tools on an IBM Personal Computer AT with an application generator on a Digital Equipment Corp. VAX. Permits developers to diagram a visual representation of an application. Intelligent guidance system, resident in central repository, serves as interactive advisor throughout development.

GT Software, Inc.

(404) 751-1400

BMS/GT-Preval/GT

For screen generation and IBM CICS screen editing. Permits prototyping sessions with the end user using multiple screens. Error messaging, range checking and field cross-checks included.

I-Logix, Inc.

(617) 272-8090

Statemate

A software tool set for modeling real-time systems and producing executable specifications. Specifications can be exercised under any user-defined condition in the simulation process.

IBM

Contact local IBM dealer

VM/Software Engineering

Designed to provide an environment for development, management and control of software applications developed under VM/SP. Supplies consistent interface to tools that allows customization based on installation needs. Allows for simultaneous development of multiple versions of the same software object and provides a collection of predefined data base queries that can be sent to a terminal, a local printer or a disk file. Requires 2M bytes of virtual storage to operate and the PL/I Transient Library to execute.

Index Technology Corp.

(617) 491-2100

Excelerator

An integrated personal computer-based software product supporting the system analysis and design process. Includes graphics facility and integrated dictionary and an integrated facility for mock-up and prototyping of screens and reports. Runs on an IBM Personal Computer XT or AT and compatibles with a minimum of 640K bytes of random-access memory.

Excelerator/RTS

An integrated analysis and design tool to aid in the design of real-time and embedded systems.

Knowledgeware, Inc.

(404) 231-8575

Design Workstation

Includes diagrams for capturing and manipulating information on screen layouts, edit rules, program structures, procedural logic and data bases and file structures.

Planning Workstation

Offers decomposition and entity-relationship diagrams and tables and matrices to capture and analyze systems development planning data. Runs on IBM Personal Computer AT or Personal System/2 hardware.

Manager Software Products, Inc.

(617) 863-5800

Managerview

Operates on personal computer intelligent workstations to provide design and analysis. Provides connectivity to the host computer through proprietary software packages. Runs on the IBM Personal Computer XT, AT and compatibles.

Nastec Corp.

(313) 353-3300

CASE 2000 Design Aid

Facilitates development of complex systems by providing multiple views of the problem. Process models developed using Yourdan/DeMarco techniques, model real-time systems using Ward-Mellor techniques and information data models using Chen techniques. Full life cycle support is provided for data modeling and data base design.

Netron, Inc.

(416) 636-8333

Netron/CAP Development Center

Series of automated software engineering systems for manufacturing custom Cobol software on IBM CICS mainframes, Digital Equipment Corp. VAX/VMS systems, Wang Laboratories, Inc. VS minis and IBM Personal Computers and compatibles. Systems employ a proprietary methodology for the creation of reusable programming components. Applications modified by respecifying program requirements. Users may write custom frames to integrate corporate standards into custom applications.

Oracle Corp.

(800) ORACLE-1

SQL Star Development Method

Method uses entity-relationship analysis to model requirements for applications. Intended for all phases of business system development and maintenance.

SQL Star Design Dictionary

A set of software tools and reports that are used as the automation aid for the SQL Star Development Method as well as for other methods. Used to document and control all phases of the system life cycle. Available on Digital Equipment Corp. VAXs running VMS.

Promod, Inc.

(714) 855-3046

Promod/DC

For automatic generation of design charts providing a graphic picture of the software system. Charts may be displayed on a screen for editing prior to plotting.

Promod/TMS

Tracks requirements of any user-defined trace item through formal requirements analysis into design. Ensures that critical elements of a program are not altered, duplicated or omitted during development.

Promod/CM

Designed to work with Digital Equipment Corp. VAX-based configuration management tools. Provides reports and files indicating what is happening to a project in comparison with a baseline.

Softlab, Inc.

(415) 957-9175

Maestro

Integrates tools for analysis, design, coding, testing, documentation and maintenance. Can be applied in any life cycle, methodology or programming language. Includes project management and time accounting, an integrated data base and a library management system.

Software AG of North America, Inc.

(703) 860-5050

Predict Case

A mainframe repository for information used in all phases of the system development life cycle. Supports requirements analysis activities and includes integrated entity-relationship data base engine. Available for IBM mainframe environments.

Natural Construct

A development productivity facility for applications written in Software AG's Natural. Includes program generator, macro facility and library of customizable model programs and subroutines. Runs in IBM mainframe and Digital Equipment Corp. VAX environments.

Systems & Software, Inc.

(714) 241-8650

Rexsystem 86-Softprobe II

An interactive debugging tool for developing Intel Corp. IAPX-86/88/186 microprocessor applications. Provides a debugging environment with access to source statements, program variables and program control flow in the same context as the development program. Real-time embedded applications also simulated.

Technology Information

Products Corp.

(617) 246-7720

Tip Relate

Provides methodologies for development of relational data models for logical design of shared data bases.

Tip Create

Assists in analysis, design and automatic generation of structured programs. Produces application programs based on data to be processed.

Tip Define

For definition, analysis and documentation of business systems and their information requirements using an integrated series of models and diagrams.

Texas Instruments, Inc.

(214) 575-4404

Information Engineering Facility (IEF)

Automates all phases of software development, including generation of Cobol code for applications systems. Complete IEF consists of five integrated tool sets: Planning, Analysis and Design tool sets residing on the personal computer and Code and Data Base Generators residing on the mainframe. Applications systems automatically generated from the encyclopedia, which functions as a repository for business and systems information.

Verilog USA

(703) 354-0371

Logiscope

An automated source code and test path coverage analyzer. Provides Halstead Metrics; Cyclomatic Complexity Analysis; Module Control Graphs and test aids; Kiviat Diagrams; and call graphs, graphical and digital, for individual modules or the entire hierarchy.

ASA

A state machine-based specification generation and analysis tool. Specifications generated from IDEF diagrams and automatically analyzed. Analysis output provides state transition matrices and graphs. Language-independent.

Viasoft, Inc.

(602) 952-0050

Via/Insight 3.0

An interactive software system for automating logic analysis of mainframe Cobol programs. Release 3.0 integrates with IBM ISPF Editor. For IBM mainframe environment.

Visual Software, Inc.

(408) 988-7575

VS Designer 2.0

Allows full bidirectional transfer of design information between personal computer workstations and hosts, including transfer of code generation. The product supports entity relationship diagrams, real-time extensions and action diagrams. Executes on IBM Personal Computer XT, ATs, Personal System/2s or compatibles.

VSSQL

An advanced query/report generator allowing SQL access to the design data base. May be invoked from programs in C, Basic and Pascal and used in IF-THEN-ELSE structures. Users can create customized reports using supplied source code. •

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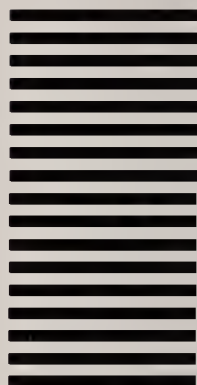
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T-1 PLANNING INTEGRATED CORPORATE NETWORKS

Dr. John McQuillan, President, McQuillan Consulting



This intensive, one-day seminar instructs you on planning issues for integrating packet, circuit, and channel switching; SNA and X.25; and voice and data in a corporate network strategy. You will address the role ISDN will play, as well as enterprise-wide networking and bandwidth-intensive applications.

Level: Intermediate.

T-2 MULTIVENDOR/MULTIARCHITECTURE LANS: MAKING THEM WORK

Dr. Kenneth Thurber, President, Architecture Technology



Attend this tutorial for a comprehensive overview of today's LAN environments. Discussion will include how to tie diverse and often incompatible network elements together in a manageable, logical way, as well as alternatives to LANs. **Level:** Advanced.

T-3 ISDN: STANDARDS, PRODUCTS AND SERVICES

James G. Herman, Independent Consultant, formerly with the Telecommunications Consulting Group at BBN



ISDN is fast approaching. Some say with too little agreement on fundamental standards and applications. Attend this highly focused, intensive session to anticipate the emerging standards, vendor trials, conflicts, successes, products and service offerings that will emerge over the next several years.

Level: Intermediate.

T-4 MULTIVENDOR NETWORK MANAGEMENT

Jerry McDowell, Vice President, Vanguard Telecommunications Inc.



Enroll in this intensive tutorial for skills in how to manage a network which links multiple carriers and a variety of hardware and software vendors in one corporate network. You will learn how to take control into your own hands and avoid finger pointing, acrimony and poor service. **Level:** Intermediate.

T-5 HOW TO BECOME A BETTER TELECOMMUNICATIONS MANAGER

Gerald P. Ryan, President, Connections Telecommunications Inc.



Today's network manager must not only understand new technologies and standards, but must also play many roles in the company. Attend this instructive tutorial for an entertaining and thought-provoking look at what you need to know to be a successful network manager, plus the tools, processes, and organization that will maximize your efficiency. **Level:** Intermediate.

T-6 THE LATEST LOOK AT NETWORK STANDARDS AND OSI

Richard desJardins, Director of Technology R&D, Computer Technology Associates Inc.



As OSI and the older standards are reaching maturity, numerous new standards are in the works. Attend this intensive session for a look at the new generation of standards — including their purpose, significance, applications, and technical elements. **Level:** Introductory.

T-7 MODELING AND DESIGNING DATA AND INTEGRATED NETWORKS

Dr. Wushow Chou, Professor of Computer Science and Electrical and Computer Engineering, North Carolina State University



Enroll in this tutorial for detailed instructions on how to design integrated networks. You'll learn about combining voice and data on a single architecture to maximize the efficiencies of wideband services, the migration from classical multipoint to distributed systems, plus cost-efficiency issues and other practical considerations. **Level:** Advanced.

T-8 IBM NETVIEW: INDUSTRY WIDE IMPLICATIONS

Atul Kapoor, Vice President, Kaptronix Inc.



This tutorial gives you a thorough and comprehensive introduction to IBM's NetView and NetView/PC — their operation, technical specs, dependencies and functional interactions, plus an analysis of their impact on the industry, significance for users, and practical suggestions for implementation.

Level: Intermediate.

T-9 OPEN NETWORK ARCHITECTURE: CARRIER/VENDOR/USER IMPLICATIONS

Haines Gaffner, President, LINK Resources Corp.



The FCC has ordered AT&T and the RBOCs to adopt ONA to stimulate competition in enhanced data processing services over public switched networks. Enroll in this tutorial to learn the details of the ruling, its implications for service offerings and an overview of who the players will be.

Level: Intermediate.

T-10 INTERNATIONAL NETWORKS: SOLVING THE PRACTICAL PROBLEMS

Len Elfenbein, President, Telcom Systems Group



Attend this tutorial if your company is expanding its network outside the U.S. You'll receive immediately useful information on tariffs, rules, how to handle ordering and service delays, the role of the PTTs, how to deal with the lack of consistency from country to country, and many more issues you must confront to succeed. **Level:** Intermediate.

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T-11 BUILDING THE NETWORK CONTROL CENTER

Gabe Kasperek, President, Kazcom Inc.

This one-day course will help you successfully operate a network control center on a day-to-day level. You will focus on the practical requirements, functions to be performed, systems and tools available and how to put them all together to gain control over your network. **Level:** Introductory.



T-12 REGULATORY ISSUES AND ANSWERS

Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social, and regulatory issues, the evolution of vendor technology and industry standards, and significant developments affecting the coming regulatory year. **Level:** Intermediate.



T-13 INTRODUCTION TO DATA COMMUNICATIONS

Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry. **Level:** Introductory.



T-14 INTRODUCTION TO VOICE COMMUNICATIONS AND PBX

James Morgan, Principal, J.H. Morgan Consultants

Enroll in this full-day tutorial for a comprehensive foundation in the basics of voice communications — technology, PBX characteristics, switched networks, tariffs and services, as well as an overview of traffic engineering. **Level:** Introductory.



T-15 IMPACT OF THE NEW POST-DIVESTITURE TARIFFS ON LARGE NETWORKS

Robert L. Ellis, President, The Aries Group

In this intensive tutorial you will learn the structure of the post-divestiture tariffs, the latest January 1988 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics in configuring data networks, the LATA-pure strategy and federal access tariffs and how to use them. **Level:** Intermediate.



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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Behind the market myth



The booming departmental systems market portrayed by so many computer vendors positioning

minicomputers as office-environment workhorses of distributed processing may, in reality, be a myth.

There will be growth in that market, and the market is in transition, but the activity will be primarily within user companies that already have departmental solutions, according to a recent study by The Sierra Group, a Tempe, Ariz., market research firm. For the start-up computer company pitching a Unix-based minicomputer, the demand for departmental systems may be only a dream, while the growth is reserved for the vendor that already has a foot in the door, the study said.

"I think the first thing that surprised me was that the market wasn't as wide open as it seemed. Are there a lot of first-time users? Yes, but not as many as the vendors put pressure on us to believe," said Marty Gruhn, vice-president of The Sierra Group.

The firm's findings may prove what some industry observers have been saying for a while: Departmental minicomputers are not for everyone.

Gruhn said demand for such systems remains high in the high-growth user companies

Continued on page 82

Low-end System/36 transition

IBM's 5363 announcement raises eyebrows on life of multiuser systems

BY STANLEY GIBSON
CW STAFF

The recent announcement of a new entry-level System/36 has sparked interest among industry observers as to the future of IBM's low-end multiuser systems. Some say they believe the system, known as the 5363, has a future that will be far brighter than the relatively dim glimmerings of the product's Oct. 20 rollout.

The 5364, or System/36 PC, requires an attached IBM Personal Computer or compatible machine in order to load the SSP operating system and run. The 5363, however, has Personal Computer components embedded in it and can come with the SSP operating system preloaded.

"Enhancements to the 5363 will blow the 5364 and 5362 out of the water," asserts Mark Webb, technical editor of Scope Publications, Inc. in Lake Mary,

Fla., publishers of a System/36 magazine.

Even though IBM is continuing to sell its Models 5362 and 5364, Webb and others say those machines, particularly the 5364, will soon be discontinued and replaced by a souped-up 5363.

Webb also maintains that the 5363 will not be replaced when "Silverlake," which IBM reportedly calls the System 3/X follow-on, is announced next year.

Instead, he says, it will live on at the bottom end of the product line, bridging the Personal System/2 world to the IBM mid-range. Silverlake will reportedly merge the System/36 and 38 lines.

'Taking a beating'

"When Silverlake comes, it won't go that low," says John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass.

"They had to improve perfor-

mance," says McCarthy, indicating that the imbedded PC would cause the machine to operate faster. "The low-end 36 is taking a beating from microcomputer network vendors Banyan, Novell and 3Com," which, he says, are gaining an ever-increasing slice of the multiuser pie.

"By the arrival of Silverlake, this will be the only low end," says David Andrews, president of ADM, Inc., an IBM mid-range consulting firm in Cheshire, Conn. However, Andrews says IBM strongly indicated that the disk capacity will not be increased beyond the current size.

"Folks that want to grow will be encouraged to move to Silverlake," he says.

Webb, however, says he believes that when 300M-byte disk drives become available for the PS/2 in January, they will also be offered for the 5363.

The drives now offered in the 5363 are also sold with the PS/2.

Continued on page 82

HP extends marketing of Unix

BY ALAN ALPER
CW STAFF

NEW YORK — Hewlett-Packard Co. is mounting a full-fledged effort to market Unix-based systems to commercial customers in a move aimed at increasing its penetration of the business systems marketplace.

HP-UX — the implementation of Unix that the company has sold to the scientific and technical marketplace since 1982 — will reportedly be offered on the HP 9000 systems family, including the Model 300 series of Motorola, Inc. 68000-based workstations and the Model 800 family of scalable reduced instruction set computing processors.

HP, which has informally sold Unix to business customers who required it during the last few years, said HP-UX will now be marketed by its Commercial Systems Business Unit on an equal footing with MPE, the firm's proprietary operating system for the HP 3000 line of business systems.

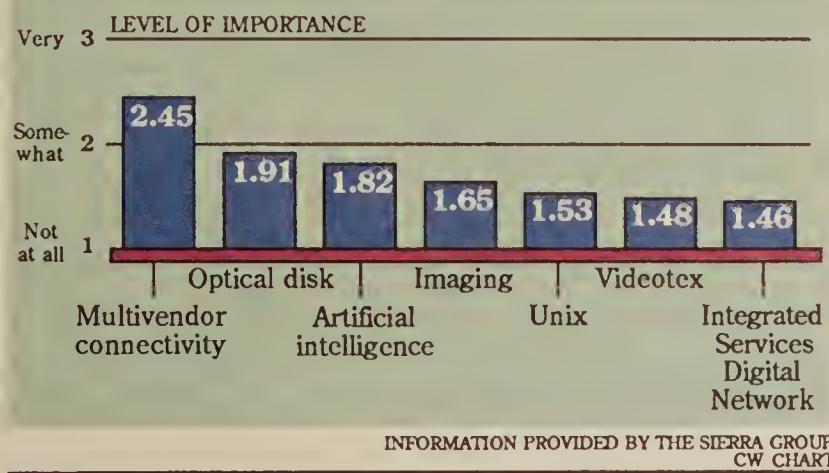
"The fact that we offered

Continued on page 82

Data View

Connectivity concerns

Multivendor connectivity is the most important user concern in departmental processing



INFORMATION PROVIDED BY THE SIERRA GROUP
CW CHART

Firm offers graphics tools

BY SUZANNE WEIXEL
CW STAFF

WILSONVILLE, Ore. — In an attempt to provide an integrated workstation platform for graphics applications, Tektronix, Inc. recently unveiled 14 products, including graphics workstations, terminals and an applications processor.

For three-dimensional design, Tektronix introduced the 4330 series of three Unix-based

Continued on page 81

Inside

- Unisys enhances document processing systems for banking applications. Page 80.
- Masscomp announces Motorola 68030 upgrade path. Page 80.
- Floating Point adds memory and I/O subsystem. Page 81.

Xerox sets move to Sun's Sparc Unix platform

BY STANLEY GIBSON
CW STAFF

SUNNYVALE, Calif. — Jumping aboard the standards ship launched by Sun Microsystems, Inc. and AT&T, Xerox Corp. recently said it will move to Sun's Scalable Processor Architecture (Sparc) Unix platform.

"This is a long-term strategic alliance," said John Shoemaker, vice-president and general manager of Xerox's document systems business. Terms of the agreement are still being worked out but will include the exchange

of technology and manufacturing licenses among Sun, Xerox and AT&T, he said.

Sun and AT&T previously announced they will pool their efforts to develop a unified Unix that merges the University of California at Berkeley's Unix 4.2, AT&T's Unix System V and the SunOS operating system [CW, Oct. 26]. Both companies said they will support the new operating system on the reduced instruction set computer Sparc chip developed by Sun.

Sun said it will enhance its SunOS to include the Xerox Net-

work Systems (XNS) standard. Sun and AT&T said they are negotiating agreements under which Xerox will purchase or manufacture Sun components, workstations and server products for itself and affiliated firms.

Xerox said it plans to utilize Sparc throughout its document processing products and systems during the next five years. In doing so, Xerox will work with Sun to migrate Xerox Viewpoint applications software and the XNS environment to Sparc. Xerox said it will use Sparc in printers, facsimile machines, copiers

and artificial intelligence workstations.

"Proprietary hardware for AI won't fly. Customers want a general-purpose workstation," Shoemaker said.

Smooth transition

Despite moving to the new platform, Xerox plans to continue to enhance and sell its proprietary workstations and network servers. Shoemaker said Xerox aims to ensure that the old product line is compatible with the new standard. He said the decision was calculated to bring more ap-

plications to Xerox products. Previously, the product line had suffered from a lack of applications, he said.

The Sun standard will include MIT's X.11 windowing standard in combination with Sun's own Network Extensible Windowing System. Xerox's own windowing standard, however, is different. But Shoemaker said it could be combined with the Sparc Unix standard. He added that although Xerox has the ability to do very large-scale integration chip design, it is more economical to purchase Sparc chips from a company such as Fujitsu Microsystems, Inc. than to manufacture its own chips.

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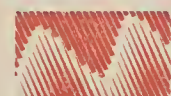
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Firm enhances document-processing systems

DETROIT — Unisys Corp. enhanced its document-processing system offerings recently with performance enhancements and ease-of-use features and introduced an entry-level teller terminal for banks.

Unisys introduced the S 4000/20 intelligent document processor, which is a Unix-based superminicomputer check-processing system with microfilm, remote communications, magnetic ink character recognition (MICR) and optical character recognition capabilities. According to Unisys, it reads 400 documents per minute and can be configured with four, six, 12, 24 or 36 pockets.

The S 4000/20 provides twice the disk capacity of earlier S 4000 models at 20M bytes of unformatted storage. It also features an optional dual-height MICR reader for reject and re-entry applications. Prices start at \$24,900. The dual-height reader costs \$5,000. An optional dual-line matrix endorser costs \$1,000. An upgrade kit for the expanded disk storage costs \$1,500.

The company also introduced the S 6010/70 in-house check-processing system, which combines a Unisys 6010 reader-sorter with a Unisys 5000/70 Unix-based superminicomputer. That system was designed to support user growth

through the addition of a second sorter and processor performance upgrades of up to 250%. Prices range from \$90,000 to \$210,000.

Unisys also announced the S 695 single-pocket document encoder as a follow-on to the Unisys S 690. Scheduled to be available in early 1988, it costs \$8,390.

The teller workstation is the B 24-TWS, which is a cluster-only workstation that uses an Intel Corp. 80186 microprocessor and accesses data from a master workstation. Master workstations in Unisys's BTOS-based product line include the B 26, B 28 and B 38. The B 24-TWS costs \$2,400.

Masscomp adds upgrades

WESTFORD, Mass. — Masscomp announced a series of upgrade options late last month, including a Motorola, Inc. 68030 migration plan, for its family of real-time computer systems.

The announcement included the introduction of guaranteed response times under the company's RTU Version 4.0 implementation of Unix. That guarantee calls for 1- to 2-msec average response times and no worse than an 8-msec response time. It is offered as part of standard packages with new Masscomp systems and is available to existing users under terms of their maintenance agreements.

Masscomp also ported Sun Microsystems, Inc.'s Network File System (NFS) to RTU 4.0. NFS will be available in February for \$995.

The 68030 upgrade package allows new and existing users of Masscomp 5600 and 5700 systems to install a 68030 board-level module and achieve up to three times the performance of Masscomp's current Motorola 68020-based processors. The module is scheduled to be available by the summer of 1988 and costs \$6,000 if ordered by the end of this year.

Masscomp also announced a package designed to encourage existing users to migrate to multiprocessing systems. The package includes a 68020 processor, RTU 4.0, NFS and 4M bytes of memory.

In other announcements, Masscomp introduced a high-performance Ethernet option and an adapter that supports connection of the VME bus and the Intel Corp. Multibus to Masscomp's synchronous memory interconnect.

Star increases system memory

STERLING, Va. — Star Technologies, Inc. announced last month that it has doubled the main memory and quadrupled the program memory of its ST-100 and ST-50 lines of 32-bit array processors.

The company also quadrupled the data cache and program memories of the ST-100.

In addition, Star announced a 35% main memory price reduction for the array processors, which are used in computation-intensive image, signal and data processing applications.

Main memories have been increased to 64M bytes for the ST-100 and ST-50. Data cache memory was boosted to 192K words for the ST-100, and program memory was increased to 768K bytes for the ST-100 and ST-50.

The upgrades were made possible through the use of denser memory chips, according to the company.

The price of main memory was cut from \$32,000 to \$20,000 for each 8M-byte increment.

Cache memory costs \$35,000 for 192K words. Program memory is priced at \$5,000 for 512K bytes and \$7,500 for 768K bytes, according to company officials.



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Toshiba offers disk drives

IRVINE, Calif. — Toshiba America, Inc. recently announced a pair of disk drives, including an 8-in. system designed to replace 14-in. or 10½-in. drives while taking up less space.

The vendor said the MK-388FA 8-in. drive stores up to 720M bytes of data and provides an average access time of 18 msec and a 2.4M byte/sec. transfer rate.

It features a dedicated servo located in the center of the disk stack for improved data integrity at environmental extremes, according to the vendor. The company claimed a mean time between failures of 35,000 hours.

The MK-388FA is aimed at the OEM

market as a replacement for 10½-in. and 14-in. drives by providing up to 1.4G bytes of data in a 19 in.-wide rack.

Two rack subsystems occupy the same space as a single 14- or 10½-in. drive providing 2.8G bytes of storage.

Scheduled to be available in January, it costs \$3,995 in OEM quantities.

Toshiba also announced the 5¼-in. MK-250 drive with a capacity of 382M bytes and a 15M bit/sec. transfer rate.

Evaluation units of the MK-250 will be available during the first quarter of 1988, with volume shipments scheduled for the second quarter. The drive costs \$1,695 in OEM quantities.

Floating Point expands memory of M64 series, adds I/O subsystem

BEAVERTON, Ore. — Floating Point Systems, Inc. last month expanded the memory capacity of two of its M64 series minisupercomputers from 36M to 128M bytes.

The expanded memory is available for the M64 Models 50 and 60. The memory is priced at \$4,375 per megabyte.

Floating Point also announced a parallel I/O subsystem designed to provide faster and more flexible I/O capabilities on the M64 series.

According to the vendor, the P64/210 is an intelligent peripheral that controls,

collects and processes data while working in parallel with the CPU. The P64/210 can be configured with up to 96M bytes of memory and connects to the M64 through a 12M byte/sec. interface.

It was designed for use in aerospace and defense applications such as large-scale multidimensional image and signal processing. The subsystem is priced at about \$100,000. Floating Point said tools for interfacing user devices will also be available this month, while tape and disk peripheral support will be available in early 1988.

Graphics tools

CONTINUED FROM PAGE 77

workstations and the 4230 series of three terminals.

The vendor said 3-D drawing rates exceed 340,000 vector/sec., and 3-D-shaded polygons exceed 20,000 vector/sec. Both the workstations and the terminals provide wire-frame, shaded-surface and true-color display, allowing the display of 4,096 colors, or 16 million shades.

All systems include a 16-in. display with 1,280- by 1,024-pixel addressability. Base pricing for 4330 series workstations ranges from \$37,500 to \$51,500. Prices range from \$23,500 to \$37,500 for the 4320 series terminals.

Other products announced include the 4320 series of Unix-based workstations and 4220 series terminals, which were designed for two-dimensional graphics. They offer drawing speeds of 90,000 vector/sec., the vendor said.

The two workstations and two terminals provide either 1,024- by 768-pixel or 1,280- by 1,024-pixel addressability. All four systems offer a 16-in. monitor and can display 256 shades of color from a palette of 16.7 million shades.

Base prices for the 4320 series workstations range from \$23,500 to \$37,500. Prices range from \$12,950 to \$37,500 for the 4220 series terminals.

Three new members of the 4310 series of workstations offer bit-mapped graphics in monochrome, gray-scale and color. The monochrome 4315 has a 13-in. display with 640- by 480-pixel addressability, while the gray-scale and color systems offer 19-in. displays and 1,276- by 1,024-pixel addressability.

The 4310 workstations support Tektronix graphics standards and can act as satellite systems in networks with 4330 and 4320 series workstations, the vendor said. Base prices for the 4310 series range from \$9,995 to \$18,950.

The stand-alone 4301 applications processor introduced with the workstations and terminals is said to provide a dedicated computing resource to Tektronix terminals. It can communicate over an RS-232C interface with all Tektronix terminals and over direct memory access channels with 4220, 4230 and 4120 series terminals. It costs \$14,950.

According to a company spokesman, the 4310 series is available now. The other products will be available before the end of the year, the spokesman said. The workstations use Motorola, Inc.'s 68020 processor and the Utek operating system, Tektronix's implementation of Unix.



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HP extends

FROM PAGE 77

Unix to business customers in the past was more of an accident than an actual strategy," noted Douglas Spreng, general manager of HP's Commercial Systems Business Unit. "The big difference now is that we have a full-scale effort to port applications to the marketplace."

At a press conference held here, the Palo Alto, Calif., company said its five-year experience of selling Unix-based systems to technical users and its adherence to industry standards will help HP penetrate the growing number of commercial and government accounts that are making Unix a prerequisite.

Also in HP's favor is the broad mix of data base management systems, vertical market applications and software development tools to port the products to the HP 9000 family. Several companies, including Oracle Corp., Informix Software, Inc. and Relational Technology, Inc., have ported their DBMSs to the HP 9000 family.

The public endorsement of Unix in no way reflects a de-emphasis of MPE, Spreng said. HP will continue to market MPE to business customers who need high-speed on-line transaction processing, he said. There are more than 350,000 HP 3000 systems installed running MPE, Spreng added.

HP-UX will appeal either to business customers who are al-

ready running Unix applications on other vendors' systems and want to upgrade to the HP 9000 family or to companies that would like their production and development systems to be one in the same. HP-UX adheres to AT&T's Unix System V interface definition and is source code compatible across the HP 9000 family. "There are a whole set of customers who are saying, 'Give me Unix or give me nothing,'" Spreng said. "To those people, we are saying, 'Here.'"

HP has shipped "tens of thousands" of systems, primarily to technical and scientific users, Spreng said. The company has developed extensions to Unix that improve its transaction processing performance and give it real-time processing capability.

Market myth

FROM PAGE 77

below the \$1 billion range. But at large companies with more than \$1 billion in revenue, only 1.4% will be installing departmental minis for the first time during the next year. Those large companies already have decided on their vendors and will provide much of the market growth through upgrades and enhancements to their installed base, Gruhn said.

Gruhn said another surprise in the results of a survey of 1,045 user companies was that no single vendor dominates the

departmental system market, not even IBM or Digital Equipment Corp. The Sierra Group also examined users' software demands at the departmental level and came up with results that may disappoint advocates of departmental minicomputers. In 10 out of 14 application categories, users in companies that already run departmental systems listed personal computers as the favored system to support the software.

Meanwhile, some minicomputer vendors are already positioning themselves to take advantage of another key user demand — multivendor connectivity and compatibility — as

firms such as DEC display their minicomputers as network servers, Gruhn said. Multivendor connectivity was listed as the most important user need and the most important emerging issue when users were asked about technologies that may impact mission-critical operations (see chart page 77).

Unix ranked fourth in user priority as an emerging issue in departmental computing, which, according to Gruhn, is a sign that it is not of great concern to most information system managers surveyed.

Connolly is *Computerworld's* senior editor, systems & peripherals.

System/36

FROM PAGE 77

Webb maintains that when the larger disk drives are announced, memory will be expanded beyond the 1M byte that comes with the machine. Webb says he bases his opinion on conversations he had with people close to IBM.

Webb speculates that an IBM Micro Channel feature could come later as well, although the communications processor is not the Micro Channel version that is in the PS/2 line but rather the Intel Corp. 80186, which is found in IBM's Personal Computer AT.

The 5363's importance as the strategic entry-level multiuser system is given added credibility by the fact that it is easy to use, a critical factor in selling to unsophisticated users. It should be easier to use than the System/36 PC, according to John McGilvrey, director of customer services for K&C Systems, Inc., a Woburn, Mass.-based firm specializing in System/36 PC development.

Confused reactions

"First-time users didn't even have PC experience. They got confused as to whether they were in DOS or SSP," McGilvrey says, referring to user reactions to the System/36 PC.

In addition, he says, the PC display is considerably slower than the 5250-type display IBM announced can now be used with the system.

The 5363's ease-of-use issue is bolstered by the fact that it can do automatic configuration, in which it understands which displays and printers are attached to it, according to IBM.

Another clue as to the longevity one can expect from the 5363 is that it is not included among the machines covered under the Technology Exchange Option, a

new leasing plan. The option allows customers who sign a multiyear lease for all System/38, 5362 and 5364 machines to break the lease for a fee, converting to a machine that uses a "different IBM technology." That fee is to be negotiated with the first lease and can be spread over the length of the following lease, according to IBM.

The fact that the 5363 is not covered under the option indicates there will be no new IBM technology machine — no member of the Silverlake family — to replace it, according to ADM's Andrews.

Thus, the 5363 could be one of two low-end multiuser pillars, the other being a still unannounced, but much rumored, 9370 "Model 10." Such a machine is reportedly in beta testing and apparently awaits only the right configuration and market timing to be introduced.

Should the 5363 and the low-end 9370 both be strong products, they could push a multiuser OS/2-based PS/2 off into the distant future. There would be no need for a system with a large library of applications, with the market niche plugged by hardware running proprietary IBM operating systems, according to John Logan, an analyst with The Yankee Group in Boston.

"IBM can see the sense for users to switch to some of the multiuser Intel Corp. 80386-based machines that run Unix. They want to keep them in the proprietary world," Logan says.

Wayne Prather, publisher of "Scope Publications," is convinced the 5363 is the harbinger of more exciting things to come.

He says the first thing to happen will be the withdrawal of the 5364, followed by the 5362. How soon, he says, depends on how many of the machines IBM has left in inventory. Then the way will be clear to turn the 5363 into a system of clearly strategic importance.

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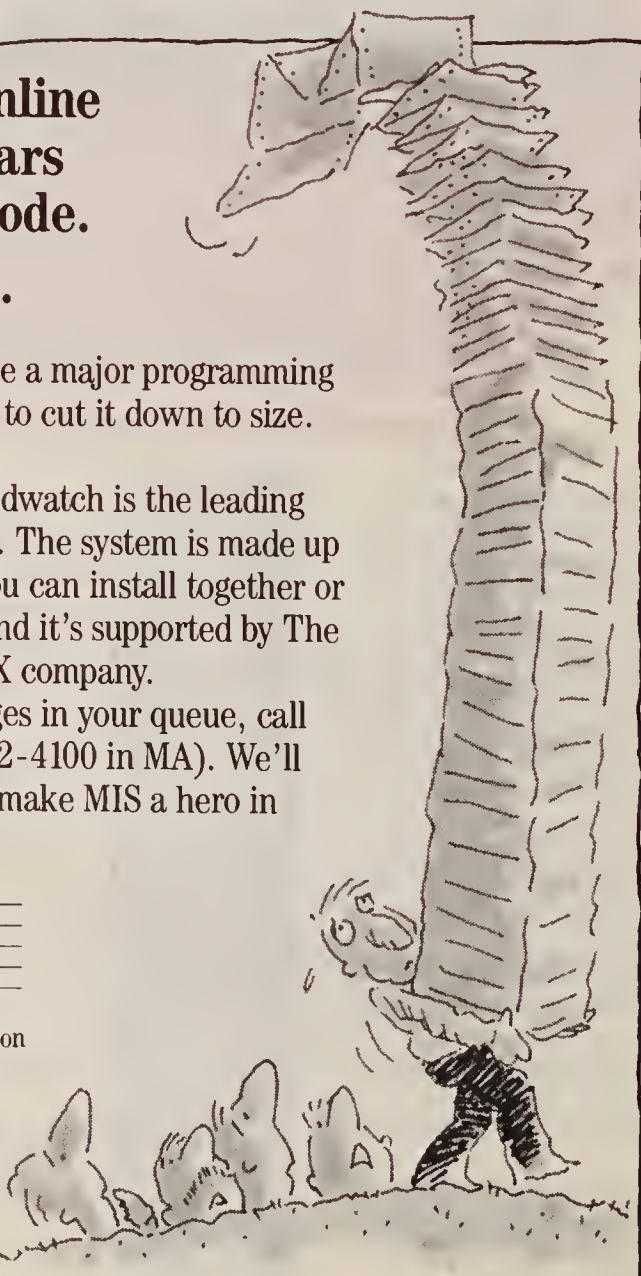
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NEW PRODUCTS

Processors

A single-board computer line said to provide 32-bit VMEbus and VME subsystem bus interfaces has been announced by **Force Computers, Inc.**

The **CPU-29** is based on the

VME/Plus architecture. It features 1M byte of static random-access memory and runs at 12.5, 16.7 or 25 MHz. It comes with VMEprom, an operating system kernel, and Forcebug, a monitor and debugger.

Other features include two serial ports, two parallel inter-

face/timers and two bus-interrupt modules.

Pricing ranges from \$2,990 to \$6,390.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030. 408-354-3410.

Data storage

A family of eight 3½-in. rigid disk drives has been announced

by **Control Data Corp.**

Named **Swift**, the drives are available in capacities ranging from 55M to 200M bytes with average seek times of 16.5 or 25 msec. They incorporate thin-film media and use enhanced small disk interfaces, small computer systems interfaces or ST506 interfaces.

In OEM quantities, the products are priced at approximately

\$6 per megabyte.

CDC, Minneapolis, Minn. 612-853-5795.

Terminals

A financial teller workstation, the **B 24-TWS**, has been announced by **Unisys Corp.**

The B 24-TWS is said to provide financial institutions with access to Unisys's Financial System Architecture (FSA) branch automation system and its associated software, FSA Finesse.

Including a CPU with 1M byte of memory and four RS-232 ports, a 9-in. monochrome monitor and a numeric/function keyboard, the B 24-TWS costs \$2,400. It supports Unisys financial peripherals.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424. 215-542-2244.

NEW AT

COMDEX/FALL '87

A wide-carriage dot matrix printer said to be compatible with Digital Equipment Corp.'s LA-75 was announced by **CIE Terminals, Inc.**

The **CI2500** features print speeds to 250 char./sec. and a graphics resolution of 180 by 144 dot/in. It incorporates IBM Proprinter and DEC LA-50 and LA-10 compatibility. Printing attributes include boldface, underline and overscore. It costs \$995. CIE, 2505 McCabe Way, Irvine, Calif. 92714. 714-660-1421.

The Image Systems Division of **C. Itoh Electronics, Inc.** introduced the **Megaline/45** ion deposition printer, featuring 45 page/min line printer emulation and priced at \$21,995.

It also introduced three twin-axial-compatible versions of ion deposition printers for use with IBM's System/36 and 38, priced from \$14,340 to \$20,340, and a line of font products for the **Megapro** series of ion deposition printers. C. Itoh, 2505 McCabe Way, Irvine, Calif. 92714. 714-660-1421.

Genicom Corp. introduced its **Model 4285** 2,000 line/min band printer.

The Model 4285, priced at \$22,995, offers a minimum print speed of 2,000 line/min with a 48-char. set. It comes standard with a parallel interface. Genicom, Waynesboro, Va. 22980. 703-949-1828.

A 10 page/min desktop laser printer featuring a 300 dot/in. resolution, 79 resident fonts and seven built-in emulation modes was announced by **Kyocera Unison, Inc.**

The **F-1000A** comes with 512K bytes of random-access memory, parallel and serial ports and a 250-page paper cassette. It costs \$2,895. Kyocera, P.O. Box 3056, 3165 Adeline St., Berkeley, Calif. 94703. 415-848-6680.

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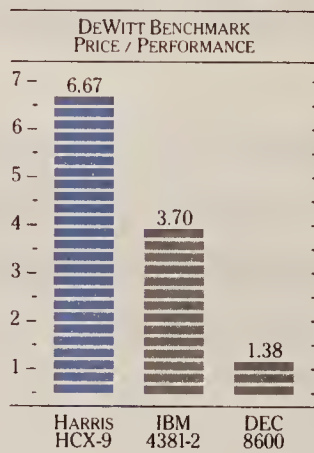
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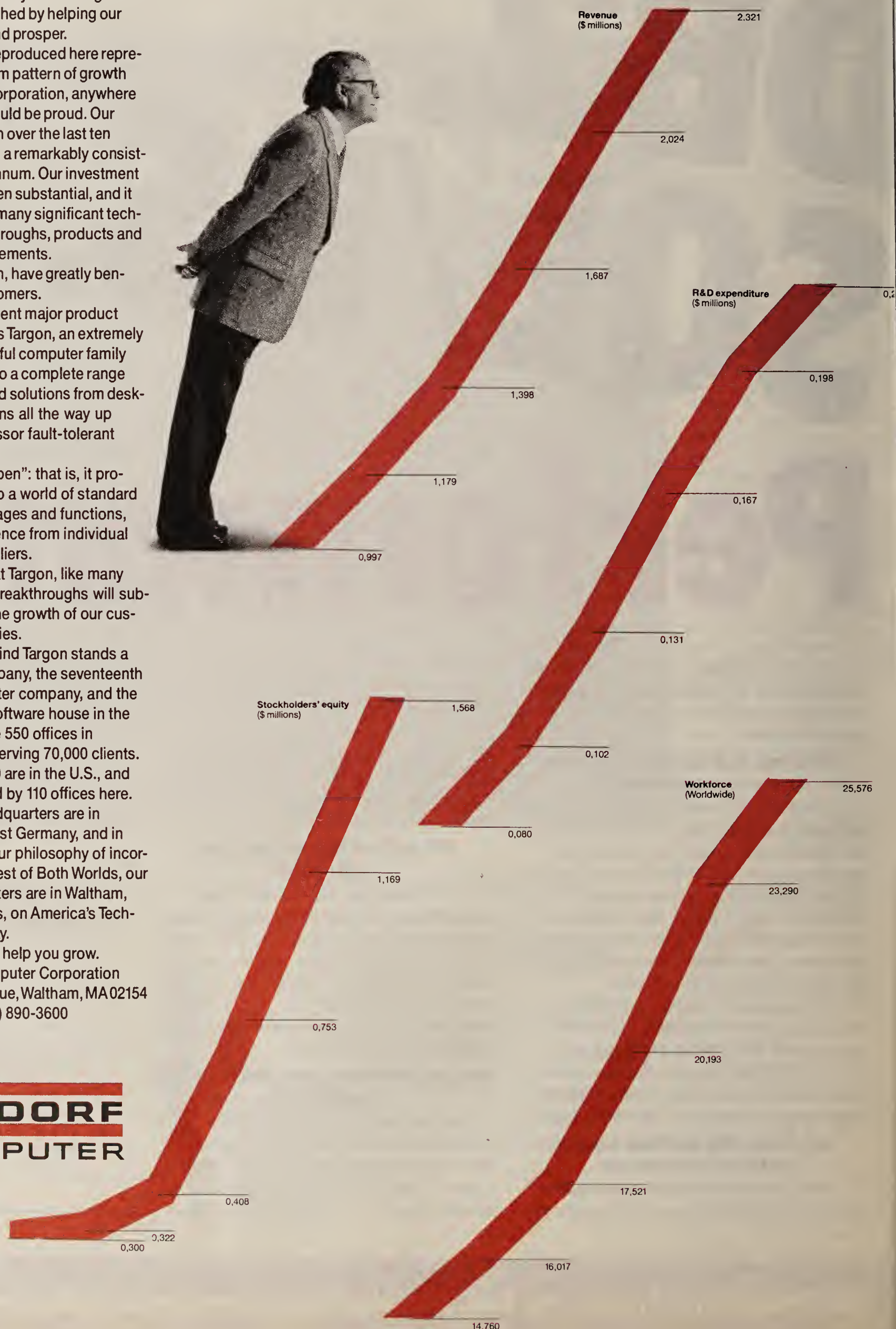
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Easy setup menus
RS232C and 20m current loop interfaces
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Other

1 year warranty
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Compose character capability
Nonvolatile memory for saving setup
National language layouts available

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HP 700/71
IBM 3191 Compatible Terminal

Compatibility Modes

IBM 3191 Models A and B, Display Station
IBM 3270 Information Display System, coax connection

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IBM style 102 and 122 key layouts
24 programmable function keys for application use
Tactile feedback

Ergonomics

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Green or amber display
Tilt and swivel
Front panel controls
Detached adjustable keyboard

Additional Features

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Automatic screen saver
Easy setup menu

Other

1 year warranty
Nonvolatile memory for saving setup information
National language layouts available

IBM 3191 Display Station and IBM 3270 Information Display products of International Business Machines Corp
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HP 700/41
Entry Level ASCII Terminal

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TeleVideo 905, 910+, 925E
Lear Siegler ADM 3A, ADM 5
Hazeltine 1500
ADDS Viewpoint A2
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Additional Features

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National language layouts available

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Data base systems get a taste of AI

A roundtable discussion with three vendors explores the options

Data base technology is currently being enriched by artificial intelligence in a number of ways. Knowledge-based systems create customized views of corporate data for personal use. Natural language interfaces help users query massive data files. Rule-based aids assist programmers in developing applications that run against data bases.

Computerworld Senior Editor Amy Fiore assembled a panel of vendors to discuss the different approaches to marrying these two technologies and to speculate on future applications.

The panelists were John Landry, executive vice-president of applications products at Cullinet Software, Inc. in Westwood, Mass.; Tom Kehler, chairman and chief executive officer of Intellicorp, Inc. in Mountain View, Calif.; and Larry Ellison, president and CEO of Oracle Corp. in Belmont, Calif. Esther Dyson, editor and publisher of "Release 1.0" in New

York, chaired the panel.

Dyson: What are the needs that Intellicorp sees for linking artificial intelligence with data base technology?

Kehler: I think one of the needs we must address is the conflict between keeping a central information system for control and data integrity and having the ability to make data meaningful for individual decision makers. Often, the decision-making process requires experience, expertise and the flexibility that I think is offered in AI technology.

The kinds of applications we might look at are things like order processing for complex orders — which involves a lot of complexity — or applications in which experience must be applied to make decisions, such as insurance underwriting. We might look at applications in which the decision maker needs to manipulate the knowledge behind the program, such as financial modeling applications.

You need a centralized data

base and data independence — data base modularity and maintainability. You also must meet the needs of individual decision makers, and a lot of flexibility can be provided by AI systems.

Dyson: Where does your company fit in?

Kehler: Our company provides a commercial package for developing knowledge-based systems. We have almost 1,600 systems out today and about 500 different customers.

We were the first company to build a bridge between knowledge bases and data bases — in fact, to Larry [Ellison]'s data base, the Oracle data base.

Our first product is named KEE — Knowledge Engineering Environment. We have a second called KEE Connection, which bridges KEE-based applications to relational data base applications through automated SQL query generation.

Dyson: How is Oracle linking the two technologies, and what are the benefits

to its customers?

Ellison: Our primary interest at Oracle is applying expert system technology to the needs of our own customer base. We are a data base management system company, and our users are primary systems developers: programmers, systems analysts and MIS directors.

Often, when companies buy DBMSs, what they're really buying is an application development tool kit. The DBMS is the foundation of the tool kit, but by no means is it the entire tool kit. People typically think of some kind of fourth-generation language as part and parcel of the DBMS. At Oracle, we have believed for a long time that fourth-generation languages, while an improvement over third-generation languages, have an inherent flaw in that they are procedural.

We believe that a good fifth-generation application building tool should not and will not burden the system builder with the "how" part of the problem. The builder will simply specify what he wants the application to do,



ANN E. YOW

Esther Dyson



CHRIS BENNION/GAMMA LIAISON

Larry Ellison



PAUL GILLIN

John Landry



CHRIS BENNION/GAMMA LIAISON

Tom Kehler

- Add intelligence to current applications
- Screen data for personal use
- Build with a fifth-generation CASE tool



John Landry (left) and Larry Ellison

CHRIS BENNION/GAMMA LIAISON

and the fifth-generation tool will then automatically generate that application. The replacement for fourth-generation languages — the fifth-generation computer-aided software engineering tool — is one important area in which we've been working.

Dyson: Your vision of AI doesn't seem to be quite the same as Tom [Kehler]'s, even though you have this supposedly complementary relationship. He differentiates between the AI application and the data base application, whereas you see AI merely as a tool for building data bases and applications.

Ellison: Many expert systems are used to

automate decision making. But a systems analyst is an expert, too. If you partially automate his function, that's another form of expert system.

I'm drawing a distinction between an expert who decides whether to grant a loan or not — and we refer to that as decision making — and something that is often not viewed as decision making but still requires expertise: the creation of computer applications or the defining of data bases.

Dyson: What is Oracle working on in this area?

Ellison: We see enormous benefits in providing fifth-generation... I don't want to use the word "languages," because they really aren't programming languages anymore. They are specification systems that make programmers more productive. They change application building so that it's a much more interactive process with the end user.

I can sit down next to you, and you can tell me what your requirements are, and rather than me documenting your requirements, I'll sit and build a system while we're talking together, and you can look over my shoulder and say, "No, that's not what I meant" and change things.

So not only is it a productivity change — a quantitative change — it's also a qualitative change in the way you approach the problem.

That's what we've been focusing on primarily: this fifth-generation environment.

Dyson: Have you been using KEE?

Ellison: No, we actually have been building this fifth-generation tool on our own.

Dyson: What is Cullinet doing to link AI with data base technology?

Landry: I'm at Cullinet based on the recent acquisition of the company that I was chairman of, Distribution Management Systems. We put together an expert system tool used to develop what you might call "smart application systems" on traditional processing platforms: IBM mainframes, the VAX and, soon, IBM Personal Computers. It's called Application Expert.

The concept is that AI technology can be used as the architecture for building a whole new generation of application systems. To me, it seems somewhat pointless to use AI technology to generate a system that's more along the conventional fourth-generation mold.

In fact, one of the biggest benefits of expert systems technology is its ability to provide, either in dialogue form or in forms mode, an intelligent user interface — as opposed to the reactive user interface that we have today in most applications systems.

So we have an opportunity here to build a whole new architecture in applications. It will take time, as everything does in data processing.

What we're working on is cooperating expert systems and the ability to finally have what amounts to a reasonable design model for building applications, because up until this point we really didn't have one.

That design model is essentially an extension or replacement of human organization structures. We can actually look at an application system as being a collection of expert systems, each one separately

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maintainable, separately enhanceable and reusable. Those facilities provide a tremendous degree of flexibility in building this new class of application systems.

Dyson: So you're talking about a new generation of applications at Cullinet, whereas Tom [Kehler] is talking about a new species. Cullinet is trying to do the same things but do them better. And part of how you would accomplish them better is by a different underlying architecture, where you're not trying to model human thought processes so much as human organizational dynamics.

What Tom is doing is amplifying, theoretically, how one individual would attack a particular problem.

Kehler: Our approaches are probably closer than that. For example, take an order processing application for a complex piece of equipment. Traditional systems don't work very well for that application. To me the key factor is: Is it dynamic or static? Most conventional methodologies are based on the fact that things don't change. Most conventional software development methodologies assume that once you know the application, the application is fixed, it's done.

What results is unhappy end users and very strongly escalating maintenance costs. And I'll bet all of us are trying to address those same problems.

In that order processing application, what would reduce your cost is being able to add flexibility and expertise. That's going to make it possible to build a more effective system. Where we differ is the functionality that's needed to do it.

Dyson: Intellicorp has a beautiful, rich interface for an end user doing modeling. Cullinet has a little set of discrete, compiled rules about different parts of the problem right on the mainframe. End users don't even have to see the rules because it's the application that uses them. I'd say that is a very different methodology.

Kehler: I would say experts don't reason. They try to retrieve data or case analogies first, or any number of other things. So rule-based programming is one component, but it's not enough to really do full-function, flexible systems of this sort.

Dyson: You are absolutely right, but some problems are not quite as complex and rich as the ones you address. You don't need a lot of richness to decide whether to use Airborne or Federal Express in a shipping department. You just need a couple of simple rules and a couple of simple pieces of data — addresses, dates, weights, rates and so on. So I would still say your two companies are addressing different problems.

Landry: The user interface in Tom [Kehler]'s system is rich, but there's a price to be paid for that user interface. It has to do with where it is deployed.

Intellicorp's [interface] is relatively expensive, from the point of view of the type of machine it employs and perhaps in terms of the processing. What we are trying to do is provide that same degree of intelligence in a platform that exists out there in the hundreds of thousands — IBM 3270 devices.

IT SEEMS somewhat pointless to use AI technology to generate a system that's more along the conventional fourth-generation mold."

JOHN LANDRY
CULLINET SOFTWARE, INC.

As time progresses, the user interface available on the PC is going to be as widely deployed as the 3270 is today, and we will take advantage of that. But what we have is an opportunity for the existing applications right now.

At the same time, we can grow that thinking to much larger environments, and that's the idea of cooperating experts.

Dyson: However, you are still dealing more with transaction-based kinds of applications, aren't you?

Both of your systems could be twisted to address the same problems, but let's face it, there are tasks KEE is optimized for, and there are tasks Application Expert

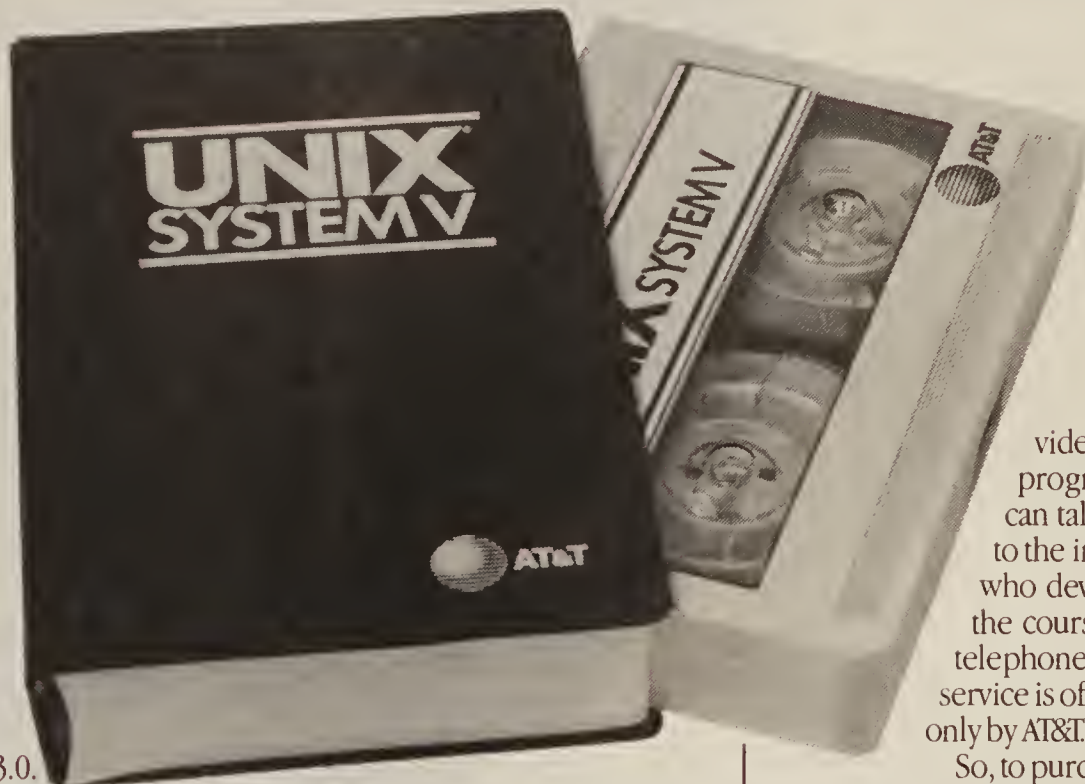
is optimized for.

Kehler: On one end of the spectrum, it's like putting an enzyme in a detergent. A little bit of AI is going to make things go better. Take what's there and increment it. Keep the same methodology, the same hardware — all of that — and try to work your way up the line of functionality to include greater application capability.

What we're talking about is coming down from the top in functionality. We're saying, "Look, this requires new methodology, new ways of doing things." And we're moving toward less expensive platforms, mainframe environments, those kinds of things.

Landry: There are certain classes of problems that are well suited to stand-alone, highly graphic interfaces, as long as

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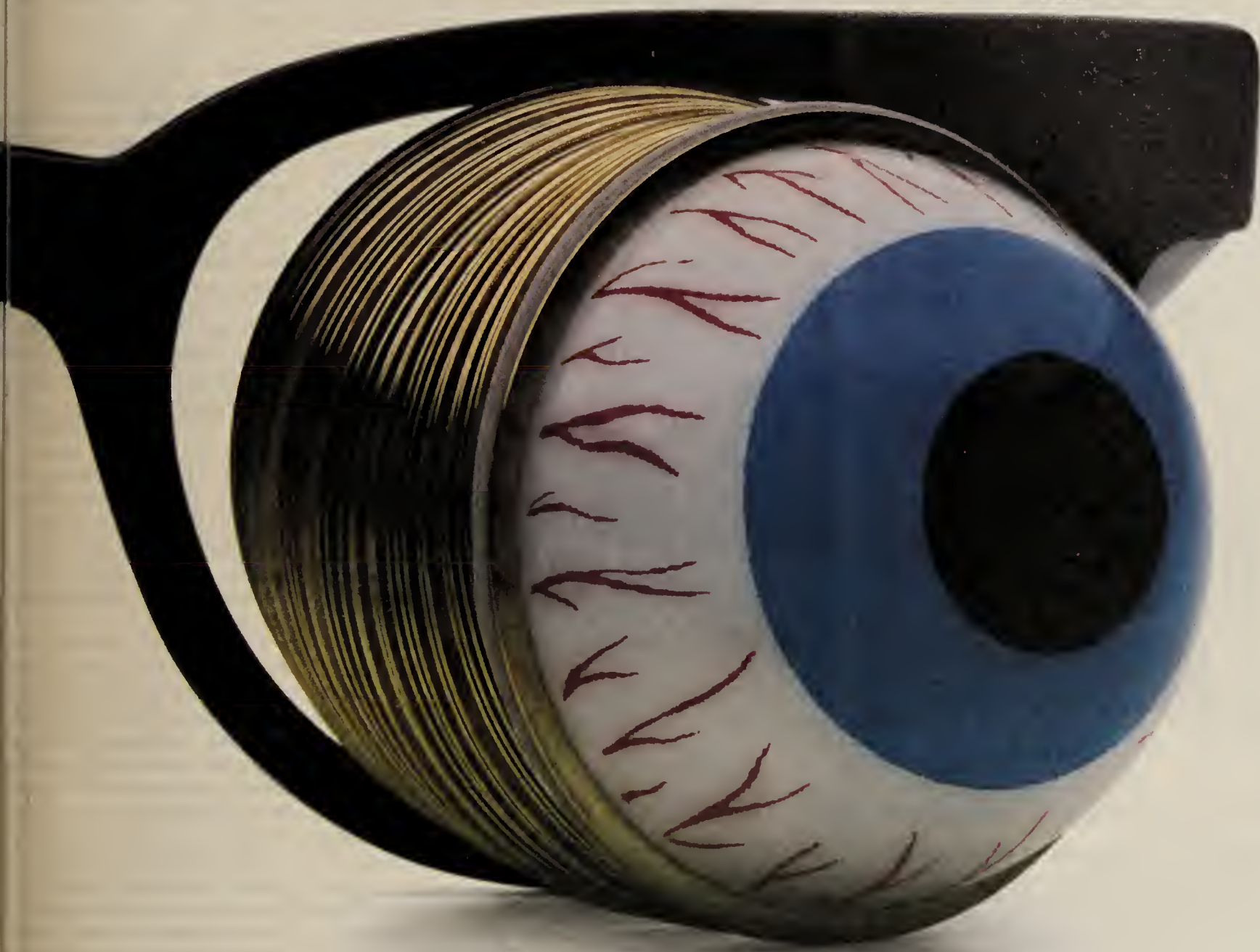
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they are tightly connected to corporate data. That is not necessarily the market Cullinet is after with the product it is offering today, which is more of a fifth-generation application development system for building transaction processing applications.

We can do a great deal to enhance applications with AI technology. Again, the example of order processing: Pricing is a component of that system that has resisted third-generation and even fourth-generation techniques for a long time. Inevitably, it is maintained and patched so much that the data processing department will resist putting in the promotions that the marketing department in fact wants in the system. It has become too fragile.

Dyson: By "promotions,"

"MOST CONVENTIONAL methodologies are based on the fact that things don't change."

TOM KEHLER
INTELLICORP, INC.

do you mean new pricing schemes, Christmas specials and so on?

Landry: Right. We could state promotions in the form of rules. If there's a supermarket in New York City and they've ordered more than \$200,000 worth of goods in the last six months, then they get Product X, a new introduction, at 10% off. That's an IF-THEN statement — it's a rule. We can augment the rule by placing a date range in the rule stating when that promotion is valid.

Then the system is somewhat self-maintaining in firing that rule.

Now that's a component of a large-scale system that already exists and that the customer is particularly comfortable with — remember, there's tremendous training involved in an international corporation — but that has caused a lot of headaches. The user can replace that component with an embedded expert system — a rule-based subroutine that sits underneath the or-

der processing system. In that type of an architecture, the clerk processing orders has no idea there's an expert system being inference-driven underneath.

Dyson: And I understand it actually works within CICS?

Landry: It works within CICS in a high-performance environment. That is what I would call the "lowest altitude" that our system runs in. The highest altitude the system runs in is when we build entire applications using this technology — not just embed new components into existing systems.

Take a general ledger — a very mundane, conventional application. If we look at it from the point of view of expert systems, there is no expert in an organization on general ledger. There are experts in budgeting, there are experts at cost accounting, at journal processing, at interfacing from subsystems and so on. Each one of them is a separate expert domain within a system.

So when we build a ledger, we actually artificially contrive the structure of that system. We take all those individual domains of knowledge and combine them into a system. When one group changes its mind, we can no longer find their knowledge.

If we look at it very differently — that this is essentially a collection of cooperating experts who pass information in an object-oriented way back and forth and that those experts get invoked by time or event triggers — we have an architecture that is very different from the way we build our systems today.

It's very much enhanced from the point of view of ease of maintenance, ease of customization for the user — which is critical now in the packaged software business — and it's also much smarter. The user interface is intelligent. It can dialogue with you.

Ellison: John [Landry] envisions AI as the basis of all new applications — all there is to an application is a rule base. I find that kind of incredible, because it implies that expertise is applied to all applications.

In fact, not all application users are experts or expert replacements, so all systems need not be expert systems.

Expert systems are best applied to very complex applications. Instead of the order processing example, what about transferring \$100 from your checking account to your savings account? Now, there are no Christmas specials on that, there are no special prices. Instead, performance is all-critical, recovery is all-critical.

Dyson: But you might want to fire a rule that says, if this customer's account balance is below X dollars, you don't want to

make the transfer.

Ellison: That can be performed algorithmically because it's unchanging. The application won't change, and to build it as an expert system, I think, is the height of nonsense.

And to say that a whole new generation is going to be built on nothing but expert systems technology is a misuse of expert systems. I think expert systems should be selectively employed. It is human expertise done or facilitated by computers, and not everything we do requires experts.

Dyson: I think there's an important question here.

In all the discussion these days about strategic information systems, the real goal of these systems is to integrate them with new products, new productivity, enhancements to a company or whatever.

Using your example, for a bank the overall system goal might be to offer fully integrated banking services. So if a customer is going to put his money into a savings account, maybe the bank wants to display the different interest rates the customer could get in doing that transaction or setting up an account.

I think that, contrary to the idea of staying with doing simpler systems in some better way, customers are looking for new products that will really affect the profitability and productivity of their company.

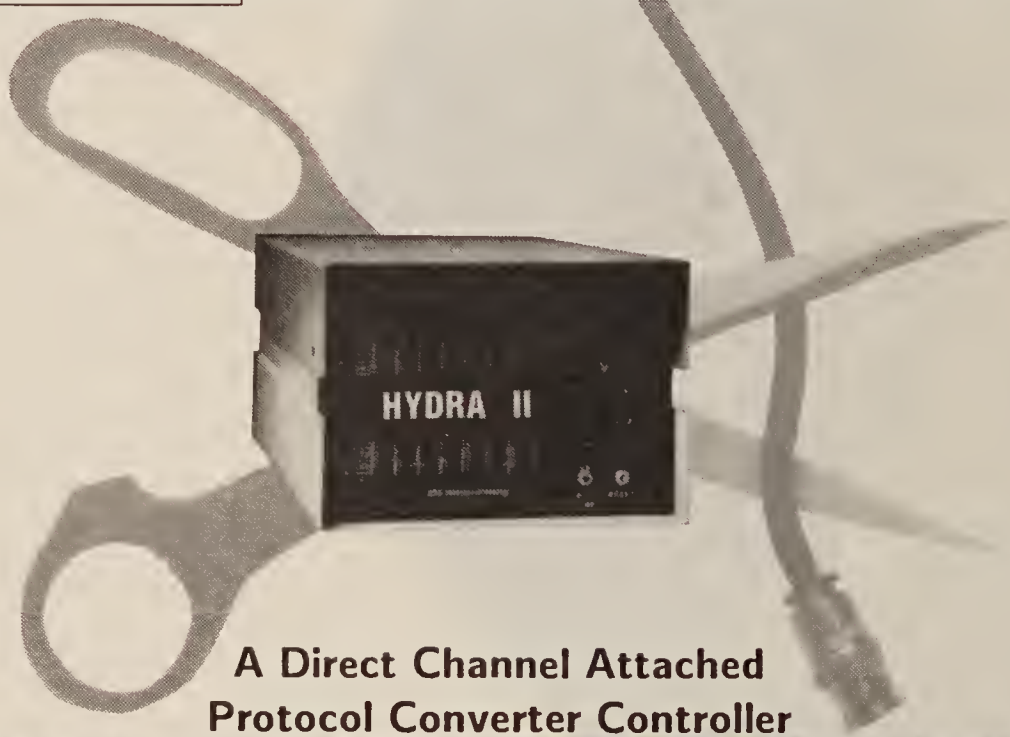
So I think it really does apply in some measure to the future development of all systems. It's the intelligence that will coordinate those simple, procedural applications.

Kehler: Let me take an angle that might shed some light on this. At Oracle, you've led the industry in creating data independence for applications. The modularity and all the features provided in relational data bases are wonderful. It gives users a way to create a centralized information store and not have to change it every time they change their application.

I would contend that you are going to run across a similar need as you design what is now the procedural part of systems: the programs that access the data. When the bank tries to integrate some new financial services product, the programmers run into this history of code. To provide the new service, they have to dive into this old beast that's been there for a long time.

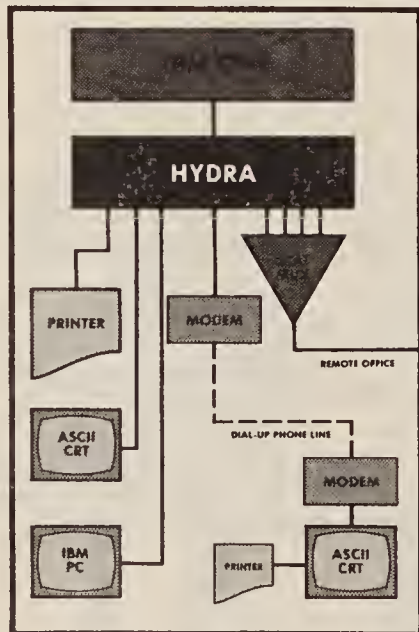
In some cases, companies won't be able achieve the new functionality because of the cost to change an old system. That is

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why AI will be pervasive in systems applications. It is going to serve the same function: creating modularity and this kind of independence and stand-alone character of applications.

Dyson: Let's talk about the marketing of AI — getting users to use it and accept it — and what its value is.

You go into an end-user organization. There are a number of ways AI could be valuable. What are the resistance factors? What are the strengths? How do you sell it?

Kehler: I think the critical issue is identifying high-value strategic applications for companies. That's where new markets are developed. You have to identify opportunities where there's a way to demonstrate a return on the investment in a new system.

TO SAY that a whole new generation is going to be built on nothing but expert systems technology is a misuse of expert systems."

LARRY ELLISON
ORACLE CORP.

So a lot of our effort focuses on going in and having the user come up with an application quickly — a prototype, in particular — where they can see this is going to meet a need.

Dyson: Does the user have to come up with a new application in order to use AI?

Kehler: No. These days, they come to us when they run into limitations of current applications.

I'll give you an example: factory scheduling. With current technology, scheduling factories has become exceedingly difficult. Companies have not been able to do it with conventional algorithmic scheduling techniques. So they come seeking other ways of doing it.

Dyson: Can you name somebody who's doing that?

Kehler: General Motors. The company uses it for their transmission system and a couple of other applications along those lines.

And Nippon Life is doing an insurance underwriting application. The company has two levels of underwriting: one that can be done with conventional techniques and one that requires applied expertise. The second level is people-intensive and takes a lot of time. Nippon has a KEE-based application for doing about 80% of the second-level underwriting. It incorporates their ratings manual, statistical analysis and modeling techniques. It lets the user look at all diseases and family histories and understand how a physician would look at these items.

Dyson: And what does Cullinet look for in terms of customers — just a user that needs a better general ledger or order processing system? You're not looking for the "big-deal," high-return applications?

Landry: Well, yes and no. Let's take an example of distribution. A company like DEC spends more on distribution than it does on manufacturing. That's a "big-deal" application to DEC. That's got high payoff.

Dyson: But you are looking toward existing applications?

Landry: Well, configuration of orders is also an existing application. Scheduling is an existing application. So is underwriting.

Cullinet looks at it from two perspectives. One is that we sell a tool to help the user either build new applications or augment his existing applications in what we consider a much better way — a much more intelligent approach to the problem,

a lot more maintainable.

The second is, Cullinet is a rather significant applications provider. By building this technology into our own applications, we provide a clear differentiation from our competitors.

We also assist ourselves by minimizing our support burden, our training burden and our documentation burden, because the systems themselves are inherently smarter.

In-house at Cullinet, using Application Expert, we built systems to determine optimum disk space requirements for particular applications based on a whole series of questions to end users regarding how they are going to use the system. The system determines how much disk space will probably be needed for each application.

We also use an installation generation system, which takes information from a customer over the phone and creates an install tape for that particular system. That method of intelligent dialogue — the checklisting of all requirements — is done in a much better way than it was ever done before. It's clean.

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express packages.

Dyson: And you have your sales lead qualification system?

Landry: That system is also becoming part of a much larger system at Cullinet: the Cullinet Knowledge System. It provides a group of expert systems to our sales and support staff that are really separate expert systems but come under the same banner. They are accessible via the phone for reference qualification, for support problems, for sales qualification, for express package advisory systems and for competitive information and strategies.

Dyson: Where do Oracle's AI tools stand vis-a-vis availability?

Ellison: We have a product called SQL

“WHY DON'T companies all use AI already if it's so great?”

ESTHER DYSON
“RELEASE 1.0”

Designer, which is an expert tool for data base design. We also have a fifth-generation application building tool.

Dyson: Does that exist now?

Ellison: Yes, it's a product called SQL Forms. You just specify the rules or the semantics of the application and it generates the application for you.

There is no proceduralism involved in it

at all.

Landry: We've made quite a leap in nondefinitions to go from “fourth generation” to “fifth generation” because it's nonprocedural!

Ellison: Well, in fact it's both nonprocedural and most definitely expert-systems driven.

The last thing we're working on right now is an expert mail system that origi-

nally was developed at MIT. The developers currently work for Oracle.

Dyson: What do you call it?

Ellison: SQL Mail, of course. SQL Mail is not an available product. The first two, SQL Designer and SQL Forms, are available products.

SQL Mail is an upcoming component of our office automation suite. It answers your mail for you based on a series of rules that you specify. The idea is to eliminate electronic junk mail.

Dyson: Why don't companies all use AI already if it's so great?

Kehler: I'd say the reason is simply because there are some barriers to entry. The selection process for applications is difficult, and availability has been a problem.

Dyson: Is it that vendors don't have enough staff to support everybody who's clamoring for these capabilities? Or is it that customers have no interest in it?

Kehler: I would say even in the add-on market — such as Cullinet's approach — there's a market development process in place, one akin to what relational data bases went through a few years ago. It's a market maturation process. It isn't explosive anywhere.

Landry: I might even call it an imagination gap — of trying to look at a system in a very, very different way. That kind of gap clearly exists today.

You've got to remember that there's tremendous inertia out there, and there's more every day because there's more installed base every day. It's hard to move people.

Fourth-generation languages really have not penetrated widely into a lot of data processing environments. CICS was around for eight years before it really had a sizable user base. AI might be even slower in the uptake.

I think AI sometimes does a disservice to itself by continuing to put new things into the bag of what's called expert systems. When people finally begin to understand something like backward chaining or forward chaining or rule-based programming, then they have to learn about object-oriented programming. Then they've got to understand truth-maintenance systems and so on. Every time they think they know something, they are told that they really should know something else.

But in reality, every step along the way can be a significant improvement in the way they are doing their jobs now. And we shouldn't continually bombard them with a lot of academic hoopla about certain features that are coming out brand-new.

Dyson: Right — It's not real AI unless you can't quite understand it or if it's not implemented.

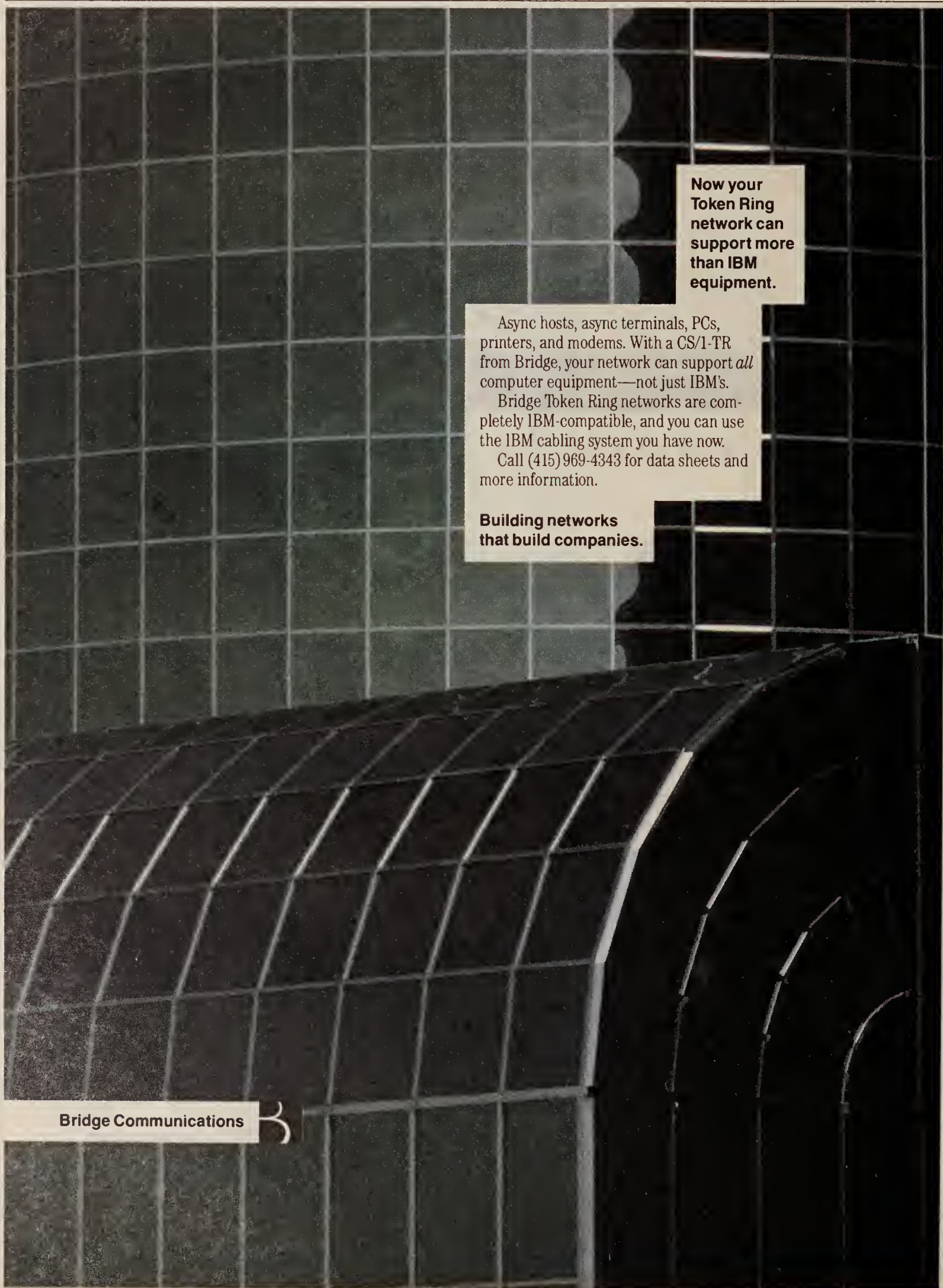
What about Oracle? Are you selling your products as AI?

Ellison: We haven't even sold our products as CASE yet!

[General laughter]

Ellison: Do we sell it under AI? We are just beginning to.

Dyson: Let's talk about how well-integrated the expert system is with the data base system in terms of being able to get back



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and forth to the data base.

Kehler: With KEE, you build a user model that is mapped to the data base. It's a user's conceptual model of how he views his data, and it maps directly to the data base. You see, the role of knowledge representation in all this is that when end users work with data, they really have to have a semantic model of that data. A lot of that is extracted in

the building of a relational model. There are details you've got to add back in for the user to be able to understand what the data means in context.

Landry: Why isn't that part of the DBMS, instead of part of your software?

What I'm getting at is, you can call it knowledge representation. But it's basically data representation. What you're doing is

layering your software to provide a richer knowledge representation than you can get out of the native data base. But that isn't an expert systems issue, it's a DBMS issue.

Kehler: I think technologically those two areas are converging, although I don't know when. There's lots of research into object-oriented data bases, trying to move up that chain, technol-

ogy-wise. Now, how that will be implemented is up for grabs.

Landry: I predict you'll see the data base system vendor strongly embracing that technology: object-oriented data bases, inheritance hierarchies and so on, whether globally or personally defined.

And although everybody for a while thought SQL was the end-all in data base, I think we'll find

there's another step coming up.

Ellison: But there are several things we can do far short of going to an object-oriented data base, although at Oracle we will gradually evolve in that direction. Short of that, we should, and could, add an awful lot more semantics in data definition that we're not doing right now.

We're at the intersection of these two technologies, expert systems and data base. It gets very interesting as you start to apply more procedures — more

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“WE’VE got to start looking at AI technology in combination with existing technologies and not so much stand-alone.”

JOHN LANDRY
CULLINET SOFTWARE, INC.

rules — and associate them with the data in the form of integrity constraints and triggers. That's the next thing you will see almost all the data base vendors embracing.

Landry: One of the things that really astounds me about the expert systems marketplace is this: A lot of things that we expect customers to look for when they're buying other systems, somehow we just escape.

If we take the concept of data dictionary, for example, everything is stored in the dictionary, and there is complete cross-referencing among all the elements of the dictionary. Somehow, when we get into the expert systems field and try to tie them in with existing systems, that concept seems to go away.

Kehler: But the link is there to the data dictionary for the Oracle data base.

Landry: Yes, but you are still operating in two different realms. The data that exists in SQL Forms does not cross-reference to the objects running in KEE. There's no central spot where I can see the relationships between pieces of data.

That type of a structure has to be built back into AI systems. The way we perceive it, this is the next logical phase in applications development technology.

Kehler: I agree.

Landry: Other issues that come to mind are things like recovery. Commit and rollback has been around since the inception of the SQL standard. But we've got to start looking at this technology much more in combination with existing technologies and not so much stand-alone. To some degree, we've had the luxury to look at it as stand-alone until now because it was considered AI, and that was considered separate. That won't work anymore. •

Martin

FROM PAGE 1

what since his glory days in the 1970s and early '80s, and although he takes his shots from detractors skeptical of his style and substance, he continues to own superstar status seemingly above any other consultant in the industry, and his earning power is as strong as ever.

Martin inspires unambiguous responses from within the industry — he is either reviled or revered.

Those who loathe his work and his popularity refer to him as a snake-oil salesman, a "prototypical fraud." But these same detractors refuse to go on the record with their remarks, either because of professional protocol or, quite possibly, for fear of Martin's immense influence.

His admirers point out that Martin can cut through the chaff to the heart of an issue very quickly. These people say he understands new technological developments and what they mean to the business world and MIS.

"He has one of the very best overall visions of the future of this industry," says T. Capers Jones, chairman of Software Productivity Research, a Cambridge, Mass., research firm.

Stage presence

Martin commands rock-star fees for appearances — \$25,000 or more for a one-day consulting job — and indeed displays a showman's stage presence rare in the stolid computer industry. He compresses four demanding careers — writer, consultant, television instructor and seminar leader — into his 52 weeks.

"It's my job to look at all the new trends in computing, put them in perspective, sort them out, clarify them and then explain them tutorially," Martin says. "My role in life is as a communicator."

In his spare time, Martin is a business executive — an unlikely partner with erstwhile quarterback Fran Tarkenton in a burgeoning software company, Knowledgeware, Inc. In fact, his ubiquity leads to the most often-heard criticism — that he tries to do too much and, therefore, cannot possibly devote enough attention to understanding deeply the technology he espouses.

Ironically, this "information Rambo," as one pundit calls him, remains aloof from any controversy about himself. He is, in fact, a surprising contradiction. Martin's dynamic, tireless stage presence belies a soft-spoken, reflective and even shy demeanor when he is out of the spotlight. Ichabod Crane-like in stature, Martin is far more reminiscent of a proper British schoolmaster than a fiery Rambo.

Divorced, Martin is the father of an 11-year-old daughter named Corinthia to whom he

dedicates most of his books. He likes quiet hikes in the mountains, swimming at his Bermuda home and debating scholarly issues of the day with friends and colleagues. His hobby is lake-building; he says he changed the map of Connecticut by constructing a 12-acre pond at a former home.

But the frenetic pace has taken its toll. Even at the end of his summer break in Vermont, Martin looks tired and older than his 49 years.

Martin spends more than half the year on the road doing exhaustive five-day seminars, television workshops and consulting. The rest of the year, he holes up either in his rented Vermont house or his spacious Bermuda residence to write his books. Strangely enough for a technology guru, he writes in pencil.

Roots

Martin's role is totally unexpected, judging from his background. A native of a central English village called Ashpy-de-la-Zouche, Martin shook off what he describes as his "peasant roots" and studied physics at Oxford University, where he received both a bachelor's and a master's degree. After a two-year stint in the army, he applied for more than a dozen jobs before joining IBM UK.

IBM sent him on his first U.S. visit in 1961 as a trainee and, later, programmer on the American Airlines Sabre project — the world's first teleprocessing system, according to Martin. He also coded assembler language on a follow-up project for Pan



Martin at his Vermont summer house

GLENN RIFKIN

for BOAC, today known as British Airways), even though he was a technical person handling the account.

The exposure to innovative technology afforded Martin an unusual perspective, and when he was approached by Prentice-Hall, Inc. Editor Karl Karlstrom, he agreed to write his first book. He was 25 years old.

That work, *Programming Real Time Computer Systems*, appeared in 1963. The experience changed Martin's life ambi-

the company's New York-based Systems Research Institute (SRI). There, Martin began to establish his legend.

Charles Bontempo, a member of the SRI teaching staff, recalls that when he joined the staff, Martin had already published 12 books.

"He was already established as quite a star in the field," Bontempo says. "He was a popular lecturer and an innovator in pedagogical techniques."

Bontempo notes that Martin was the first person at IBM to use multiple screens and sound tracks. "He added a lot of student interest," he says.

Software Productivity's Jones, a fellow SRI staffer, recalls that being part of IBM gave Martin access to a "very powerful research capability. We had key words on topics of interest to us, and we regularly received articles, books and abstracts from IBM, the Library of Congress and other major libraries about anything related to those key words." Martin made full use of the research material to help formulate the concepts and predictions that so accurately depicted the industry.

Corporate life

Entering the 1970s, Martin's fame spread, but he was feeling pressure. IBM has never been a place that fosters superstar status among its employees, and the corporate pinstripes were none too pleased with Martin's growing reputation outside company walls.

Martin claims he was the first IBM employee to publish books on the outside, and his doing so sparked the company to create a policy demanding that all publishing royalties be turned over to the IBM. Martin balked and

was granted immunity.

But with the onset of the antitrust action against the company, Martin's freedom was being squeezed. "They censored my books," he says.

"During the antitrust case, the lawyers caused paranoia at IBM," Martin recalls. At the time, it was difficult for an IBM employee to give external seminars or write books. "The lawyers wanted detailed censorship and control. It sometimes took them longer to censor my book than it took for me to write it. I felt that my role was as an industry spokesman, not an IBM spokesman."

By 1977, having established a reputation in a variety of areas — telecommunications, data base management, teleprocessing and distributed data processing — Martin decided to take a year's sabbatical to travel and initiate his world seminars.

Among other things, he discovered a taste for the riches his skills could command. "I was surprised that it was possible to make that amount of money," he says. The amount was more than the president of IBM earned that year, and it convinced Martin to leave IBM for good.

Martin says he has never looked back. With his calendar already booked into the 1990s and his four-faceted career going strong, Martin has managed to coordinate what seems to be an impossible schedule.

The secret to coping, he says, is doing absolutely no administrative work for himself. His schedule and time are coordinated by people in his various organizations: Technology Transfer Institute sponsors and schedules his U.S. seminars, Savant Research Studies handles that function abroad, Deltak, Inc. in

You be the judge

In 1980, in an interview published in Computerworld Extra, James Martin made the following predictions for the 1980s. How close was he?

- ▶ The Japanese will produce chip technology that could become better than Silicon Valley's. America may well lose its technological lead to the Japanese.
- ▶ The future of data base machines is very bright. It is the way to go.
- ▶ Bubble memory will be one of the most important memory technologies of the future.
- ▶ Protocol conversion machines and protocol-handling devices are the long-range solution to the confusion in communications.
- ▶ Systems Network Architecture (SNA) has a tremendous future. Major changes in the 1980s will increase the diversity of higher level functions and make SNA conform to international standards.
- ▶ The best teachers will make more money than film stars by the end of the 1980s because of videodisk and telecommunications.
- ▶ We are going to make big mistakes with technology — much bigger, for example, than Three Mile Island.
- ▶ By the second half of the 1980s, videodisk will become a mass consumer product, a major technology.
- ▶ We can expect more pocket terminals, ubiquitous public data networks, more dense memory and logic chips (for example, 10M-byte chips after 1990).

CW CHART

American World Airways.

Martin's ability to communicate the complicated machinations of this industry became apparent early in his career. During a two-year stay in Paris in IBM's world trade office, for example, he got that division's biggest sales order to date (a worldwide reservation system

tions. He saw potential far beyond writing code. In the ensuing 25 years, he has written or jointly written more than 40 books, all with Prentice-Hall.

Already popular

After Martin's two years in Paris, IBM called him back to the U.S. and offered him a position in

Check back in year 2000

What does Martin expect in the next five to 15 years?

- ▶ Optical fibers will become more widespread, with transmission speeds up to 100M bit/sec. in the next five years.
- ▶ There will be a big change in software development. Integrated computer-aided software engineering will become a platform on which fundamentally new methodologies will be created for the development of applications.
- ▶ In about five years, 98% of all MIPS, or million instructions per second, will be on the desk. There will be 1,000 times as many workstations as there are mainframe computers.
- ▶ MIS will be using formal automated tools, so there will be less emphasis on programming and difficult coding.
- ▶ The job of the programmer is migrating in the direction of an analyst, and the job of the analyst is migrating in the direction of being a business person.
- ▶ By 2000, we will have seen the marriage of computers and television, giving us things like windows on the conventional television.

CW CHART

Chicago produces his television seminars, Prentice-Hall handles his books, and James Martin Associates, Inc. (JMA) in London and Reston, Va., coordinates his consulting.

Among those in the MIS community that attend his packed seminars and lectures, Martin's intensity and scope is without peer. "He is awe-inspiring," says Michael Koltnow, a vice-president and systems analyst with The Kirchman Corp. in Altamonte Springs, Fla. "It's astounding that a person can have a grasp on the breadth of information that he has in such de-

tail," he adds.

"He's a walking encyclopedia," adds Sam Pritchard, manager of telecommunications at Union Carbide Corp. in Danbury, Conn. "He is very dynamic and is on the leading edge of technology."

To the charge that he is all sizzle and no steak, those who watch the industry tend to disagree. "A lot of people have spent a whole lot of money listening to him over the past 10 years," says Charles P. Lecht, an International Data Group News Service foreign correspondent and a longtime indus-

try watcher. "It takes a lot to make people spend their hard-earned bucks listening to a phony for so long a period of time. He may not know everything, but only a fool would think him a phony."

"He has been invaluable to me," adds William Zachmann, an analyst with International Data Corp. in Framingham, Mass. "He has had a tremendously positive impact, especially in his early work."

Not a theoretician?

Despite — or perhaps because of — his popularity, Martin also draws the wrath of some industry experts, particularly those with a deep knowledge of and interest in areas on which Martin treads.

One leading software consultant, who insists on anonymity, says, "He is mainly a showman; he puts on an entertaining show. But his is a noncontribution in any theoretical sense. I know of no good idea that he has come up with that will survive his lifetime."

This critic says Martin tends to create labels such as "fourth-generation language" but then fails to define them. "He may have influenced the industry to be more flexible, but he has promoted products that are weak.

He has done the industry a disservice by misrepresenting what is right."

Another Martin critic from the academic field, who wishes to remain anonymous, adds, "When trouble strikes the industry and problems arise that seem incurable, that is when the quack flourishes and can sell the snake

MARTIN commands rock-star fees for appearances and displays a showman's stage presence rare in the stolid computer industry.

oil. His books are precisely the kind of soothing thing a troubled market wants to read. But they are terribly superficial."

But, Jones responds, "The industry needs people who are broad as well as deep. I'd rather listen to Martin talk than a lot of people I know who are experts in one area but have tunnel vision and can't see how that area relates to anything else."

Martin's star does seem to have faded a bit recently. His name is less a fixture in the in-

dustry trade press, and his predictions, which helped establish the legend, have been shot in less rapid fire and with more key misses than in the past (see chart page 99).

Missed the PC

"Some of his more recent ideas are not always as on-the-mark as an infallible guru should be," Zachmann says. "He didn't do much, for example, to predict the impact of the personal computer, and he has offered no terrific insight into the emerging second generation of information systems."

"His focus seems much more traditional," Zachmann adds. "I don't think of him as someone I'd look to for the future of what's going on in this industry now."

Martin admits to missing the PC revolution call — "as did everyone else," he says. "When you get many components happening at the same time, you need to synthesize the components, and very often the synthesis of the technology is more than the sum of the parts. The personal computer was a paradigm shift in the usage of computing."

But Martin rejects the idea that his new work is losing its luster. He points to the continuing popularity of his seminars

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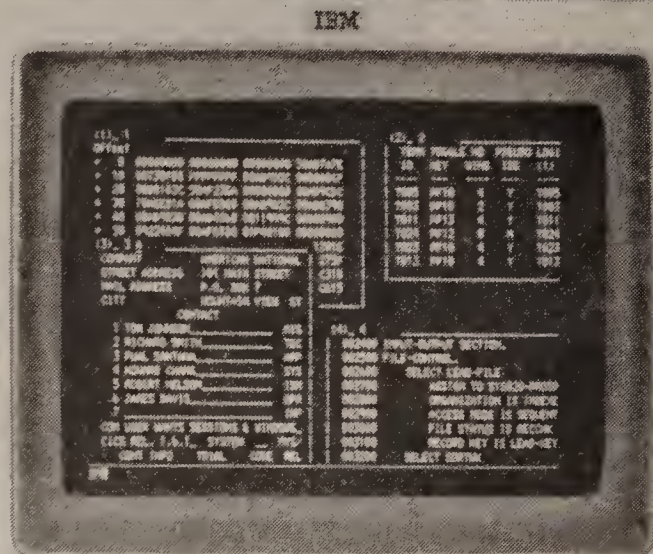
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and books.

Martin has stoked the money-making machinery well. He not only commands a high fee for his seminars, but he gets a percentage of the gate as well. His books gross more than \$1 million per year in sales. Conflicts in his schedule, he says, are decided by "where I can get the most money or what interests me the most."

Martin claims to consult free of charge if he is interested in a particular technology or MIS situation and "can learn from it. If it's a pain in the neck, I'll charge a lot." He is known to invite a start-up vendor to his Vermont home for a day of give-and-take about a new software package. "Quite often, I'll go into IBM and consult for free," he says. "If I'm going to see Ralph Gomory [the head of IBM research] or someone like that, I don't charge. I'm sure he'll help me more than I can help him."

'Worth the money'

What makes Martin worth \$25,000 per day to an MIS shop is simply an invocation of the old tenet that the credibility of someone is directly proportional to what you have to pay to get his advice.

"If his advice can save a company \$25 [million] or \$30 million, then it has paid for itself," Jones says.

"If he can just convince the top executives that DP is more than just a cost center, he is worth the money," adds Martin Goetz, senior vice-president of Applied Data Research, Inc. in Princeton, N.J., which employs Martin to promote its products.

Martin acknowledges that his fees are prohibitive many times, and in those instances he recommends that his JMA consulting firm substitute for him. He believes his services are called for in more extreme situations, such as when there is a political logjam between top management and MIS.

"Often, MIS doesn't communicate well with top management, and I might go in and explain to the top executives that MIS has now become a critical success factor to the business," Martin explains. "Some DP organizations are vast, with hundreds of managers, and I might go in for a day of intensive education designed to get them working together."

Despite the exhaustive schedule — he claims to take just two weeks vacation each year — Martin says he spends fully 50% of his time learning. "I spend more time studying, picking things apart, writing, than anybody else in the industry," he asserts. His activities, in fact, feed off each other, with expertise gathered in his consulting, for instance, applied to his seminars.

Martin stresses that he admits when he doesn't know the

answer. "If I don't know a subject, I don't open my mouth," he says. "Certainly, at the present time I wouldn't profess to know as much as, say, [E. F.] Codd does about relational data bases."

'Far ahead of us'

Seminar attendees often leave the week-long sessions in awe of Martin. If they express dissatis-

faction, it is simply to state that "he's too far ahead of us," as one systems architect from a major insurance firm put it. "I'm not sure he appreciates what a company with old systems still in place has to face. My impression is that he's impatient about not moving ahead more quickly. He's excited about fiber optics, for example, but we're not there yet."

There is, ironically, little concern among his seminar attendees about some obvious conflicts of interest.

Martin's latest cause celebre is computer-aided software engineering (CASE), a concept he has pushed hard for in the past seven years. His interest first brought him to Higher Order Software, a Mass.-based firm with a product he believed in so

strongly that he wrote a book espousing it. He invested money and became a board member at the firm but was frustrated by the company's poor management, which, he says, drove it out of business.

Martin also began Database Design, Inc. in 1979 (it has since been renamed Knowledgeware, Inc.) to develop CASE design tools. Realizing the need for a

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code generator to be tightly coupled with his design tools, Martin searched for and found Fran Tarkenton's company, Tarkenton Software, Inc., in Atlanta. They met, and during a 45-minute limousine ride to the airport, the pair settled a deal merging the companies.

"We're both hard-driving guys, and we hit it off right away," Tarkenton says. "Know-

ledgeware provides him a vehicle with which to put substance behind his words."

Martin admits that wearing the hats of both vendor and consultant smacks of conflict of interest. "It's difficult to live without conflicts of interest of some sort," he explains.

But he insists that the conflict does not color his view of the CASE market, either in his con-

sulting or his seminars. "I tell everybody up front that I am associated with Knowledgeware and with JMA, and nevertheless, I am going to try to give them an objective view of where the industry is going."

No trouble

Martin says he has no trouble touting a rival's product if it has the list of characteristics he be-

lieves a CASE tool must have.

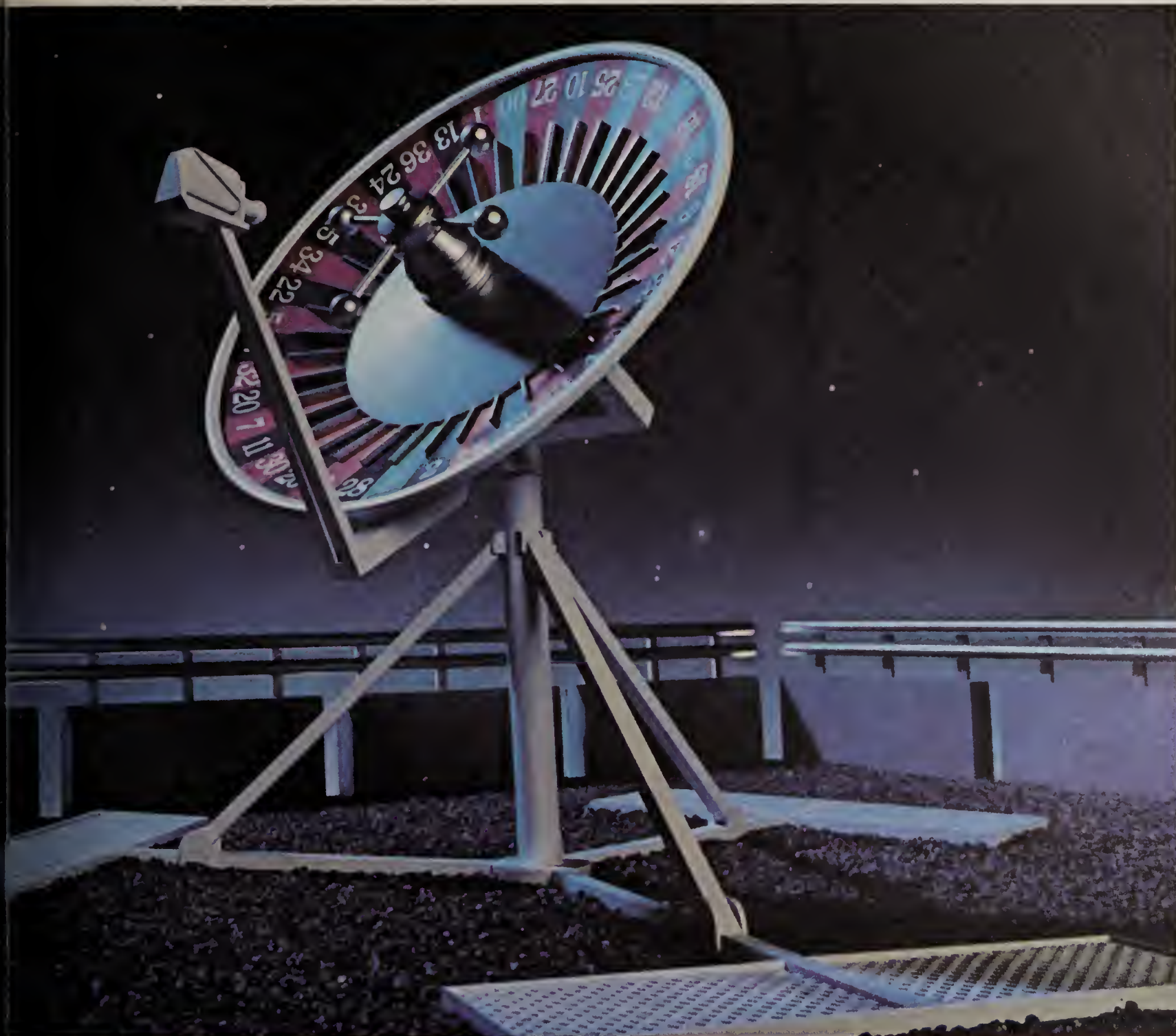
"I would never say Knowledgeware is the best because I'm part of it," he declares. "There are certain characteristics one would want in CASE tools, and I am pushing Knowledgeware as hard as I can to build products with those characteristics." To back his claim, he acknowledges that Texas Instruments, Inc.'s IEF CASE tool

is closer to his perfect model than Knowledgeware's is.

"I'm going to make more money out of my seminars, books and Deltak work than anything else," he says. "So my main motivation is to do that with maximum integrity so people will keep coming to my seminars, buying my books and using Deltak courses."

Seminar attendee Pritchard from Union Carbide supports Martin's claim. Martin, he says, brought Knowledgeware representatives to an after-hours

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IF [Martin] can just convince the top executives that DP is more than just a cost center, he is worth the money."

MARTIN GOETZ
APPLIED DATA
RESEARCH, INC.

gathering during a recent five-day seminar, but he also invited representatives from other CASE vendors. "He obviously feels his product is good, but he didn't try to push it. The whole thing was conducted in a very professional manner," Pritchard says.

In fact, Martin seems to have reached a point of independent wealth where his concern for getting his point across transcends the dollar value. His passion for information engineering concepts and integrated CASE (ICASE) rings genuine.

He particularly espouses the concept of ICASE tool kits, which, as they generate code automatically, generate data bases, JCL, documentation and more in one package. This ideal package doesn't exist yet, although Martin claims some vendors are close.

"When we get ICASE facilities really working smoothly, there is going to be a paradigm shift in the industry. ICASE, when it is mature, will be the largest change in the profession of computing in 30 years," he maintains.

"It's as if the forestry industry were changing from hand-saws to chain saws. We are now, for the first time, beginning to get power tools for the MIS professional. And don't expect to win a high salary five years from now if you can't use the chain saw."

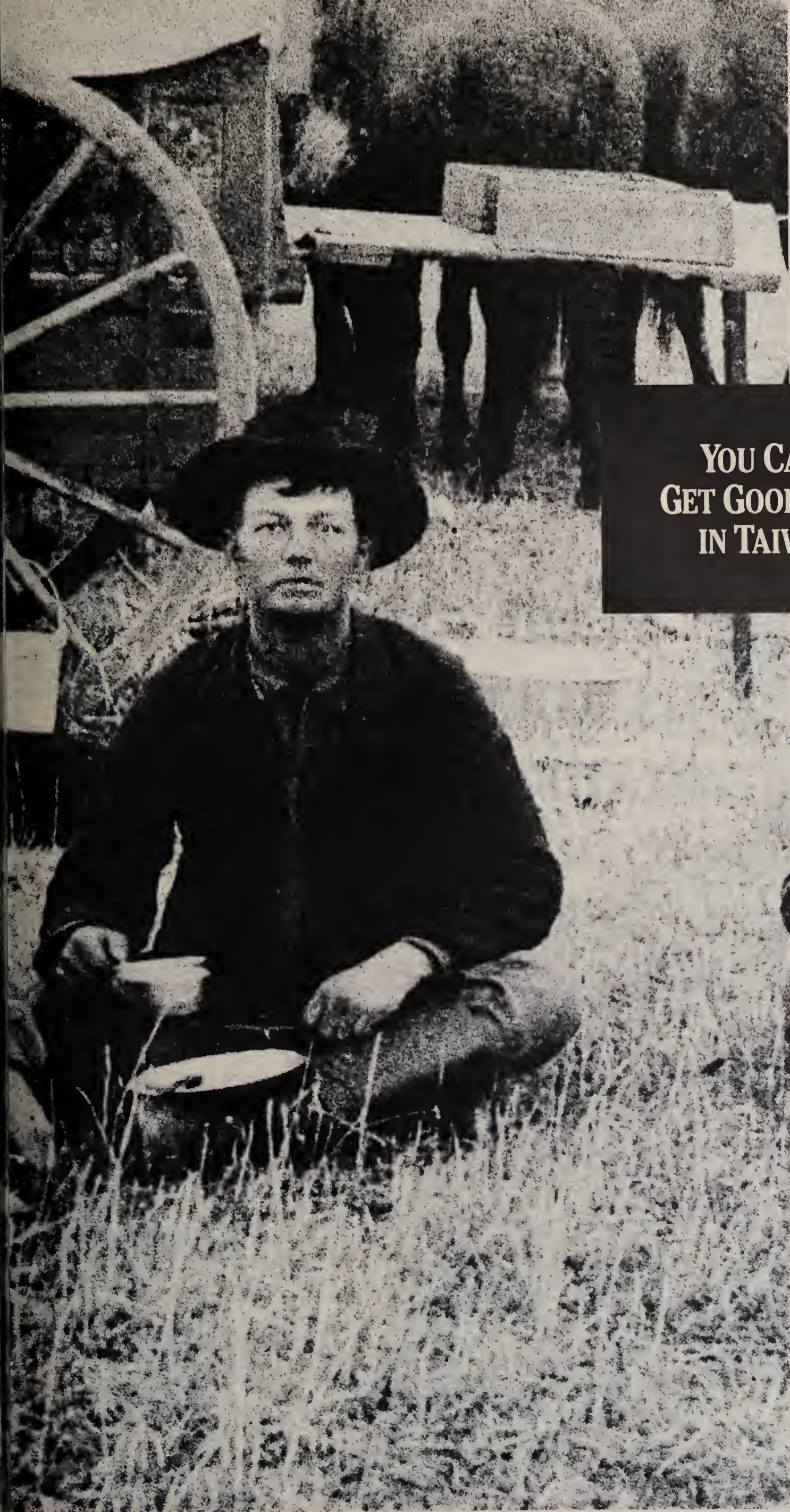
Perhaps the most effective measure of Martin's influence is the reaction of his audience. Kirchman's Koltnow is typical of an attendee at one of Martin's \$1,500-per-week seminars.

"He fires you up," Koltnow says, "even though my enthusiasm was dampened when I returned to the real world. Personally, I found him inspiring." •



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David A. Ludlum

See you later, 'CIO'



Despite a proliferation of publications and consulting services explicitly targeted at CIOs — chief information officers — some MIS managers in positions to know are questioning whether having that title is a good thing.

The subject is one that came up during a roundtable discussion among reporters and several CIO types — none of whom use the title — during the Society for Information Management's annual conference in Seattle last month.

A couple of the participants among the information managers suggested that the CIO concept, or at least the title, is more in favor with the MIS trade press than with practitioners.

The chief reason for skepticism toward the title among the practitioners seems to be concern that it will be regarded as empire building and self-serving hype by corporate peers and superiors. "My feeling is that it's self-serving, and it smacks of self-aggrandizement," said Dudley Cooke, one of the participants, in comments after the roundtable.

"I think, from an organiza-

Continued on page 112

Having fun at Apple

Loren forsakes Cigna to find meaning of MIS

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — After nearly 15 years in MIS, Allan Z. Loren has found himself.

Loren recently left Cigna Corp., the Philadelphia-based insurance giant, where he was the senior vice-president in charge of Cigna Systems, the company's data processing arm.

His departure, after 16 years, surprised his co-workers. But they were in for an even bigger surprise when he announced his plans. An Easterner all his 49 years, Loren said he would head west to the land of sun, surf and Macintoshes to take a job at Apple Computer, Inc. as head of its MIS department.

"The people who didn't know him well were probably surprised that he left," says Jim Valenteen, senior vice-president of staff operations at Cigna. "The people who were close to him probably weren't that surprised. After all, he was a technology guy at an insurance company. And he still had room in his career for a dramatic change."

"But I think everyone was surprised at California," Valenteen adds, "although he is an adventurous kind of guy."

At Apple, Loren, vice-president of information systems and technology, has retired his blue pin-striped suits in favor of khaki slacks and open-necked sports shirts. But the changes are more than cosmetic. Although at Apple for only about two months, he has already adopted many of

PROFILE

Allan Z. Loren



Position: Vice-president of information systems and technology, Apple Computer, Inc.

Mission: To bring experience with a large IBM shop to bear on Apple's drive to implement strategic information systems.

the California computer company's philosophies.

Asked why he left Cigna after nearly two decades, he replies, "I have the opportunity to participate in a journey that will have a profound impact. There are all these articles in the press saying that technology hasn't made a difference. I ran a big, successful, technical operation, but I would say that we didn't make that much of a difference. Apple has embarked on a journey to make that difference."

The "difference," Loren says, is the degree to which technology is used in a company.

"Most technology has gone

Continued on page 108

Baxter, American try to make marriage work

BY DAVID A. LUDLUM
CW STAFF

DEERFIELD, Ill. — Merging the information systems organizations after Baxter Travenol Laboratories, Inc. acquired American Hospital Supply Corp. was something like a marriage — without the honeymoon.

"People were really ingrained in their ways and their systems and their managers and their facilities. They were just not as flexible to change in a lot of ways that I had thought they would be," said Michael S. Heschel, the Baxter Travenol executive who was given charge of the combined systems organization.

Heschel, now corporate vice-

president for information services for Baxter Travenol, likens the merging of the organizations to a marriage, an analogy buttressed by his observation that issues of attitude and personality provided by far the greatest hurdles in the merger process.

"I did not think that the differences in the two cultures in the systems groups — plus, within those cultures, the pride in systems accomplishment — was quite as strong as it turned out to be," Heschel said. "As a result, it was much more difficult in terms of combining people, groups, systems and functions than I had thought it would be."

A case in point: when Ameri-

Continued on page 109

Data View

An office evolution

Four stages of the evolution of office information systems, according to The Diebold Group*

Characteristics	I	II	III	IV
Support all key department functions				
Integrated master files (many kinds of data)				
Emphasis on solving specific business problems, mainframe retrieval and update (limited file integration)				
Mainframe information (retrieval only)				
Early microcomputers (freestanding), electronic mail, word processing				

*Stage I: Office automation
Stage II: Distributed data processing
Stage III: Office information systems
Stage IV: Integrated office information systems

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Mac making moves

Allan Loren's lifestyle is not the only thing that has changed dramatically with his coast-to-coast move from Cigna Corp. to Apple Computer, Inc.

Loren has moved from a company that relies on traditional technologies to one that is exploring alternatives. At Cigna, there are few Macintoshes. As could be expected, the Macintosh permeates Apple. Upon arrival, every Apple employee is equipped with a telephone and a Mac, which are linked through the Appleshare network.

Loren, however, says he is eager to dispel the notion that the Fortune 500 is solidly IBM. "All big businesses use IBM," he says. AT&T was Cigna's leading vendor, but the company also used Digital Equipment Corp. systems and Tandem Computers, Inc. mainframes.

Apple uses systems from DEC, Tandem, Cray Research, Inc. and, yes, IBM. "We have Macs talking to System/38s, to VAXs, to Tandems," he says. "We're going to make it even easier to take the Mac to those technologies over time."

Macworkstation, a software product allowing a Mac to be used as a front end to a host computer while retaining the Mac's graphical interface, is one of a number of future products in that vein. A product that was developed for internal use at Apple, it is expected to be publicly released Jan. 1.

With communications capabilities, the Mac will become the workstation of choice, Loren says. "The current installed base of workstations — Wangs, MS-DOS, 3270s — is all garbage," he says. "You have wires everywhere, footprints that are ugly, protocols that are mindless. When you take a Mac and place it next to the rest, all that other stuff pales in comparison. It amazes me that people would want to perpetuate that technology."

JULIE PITTA

Having fun

FROM PAGE 107

to the administration of a company but not the actual management of it," he says. "Systems sometimes look like processes; processes look like bureaucracy. Systems should facilitate the work, not clog up the arteries."

A native of New York, Loren says he believes there has always been a Californian hidden under his East Coast exterior.

"I'm more at home here than at Cigna," he says. "I used to struggle there to maintain my individual identity and still fit into a large corporate environment. I can be myself here, which is really a big teddy bear."

"One of the things that's attractive here is that you can have fun," he adds. "But 'fun' was not on the list of things that you're supposed to have in my generation. You were supposed to make money, have a family and settle down."

But it took time and entreaties from Apple Chairman and Chief Executive Officer John Sculley, Chief Operating Officer Del Yocam and Chief Financial Officer Debbie Coleman to pry Loren from Cigna. "They wooed me over an extensive period," Loren says.

His defection is considered a coup for Apple; at Cigna he had a 4,000-employee operation, a budget of \$350 million and was in demand as a guest lecturer.

Yocam declined to discuss Loren but said in a prepared statement that Apple needs strong information systems to make decisions effectively as it

managed well-articulated company," Loren adds. "They're very well established on process. But they've had almost 200 years to work on it. It's the difference between a company that has roots to 1792 and a company that's 10 years old."

Conversely, Apple's lack of structure has contributed to-

"ONE OF the things that's attractive here is that you can have fun. But 'fun' was not on the list of things that you're supposed to have in my generation. You were supposed to make money, have a family and settle down."

ALLAN LOREN
APPLE COMPUTER, INC.

grows and that Loren has demonstrated that the use of systems can give a company a competitive edge.

Although it appears that Loren's conversion is complete, he allows that he misses some of the structure at Cigna.

"We struggle at times with some of the basic management processes here — the way we plan and budget," he says. "Sometimes that struggle gets in the way of the real work."

"Cigna is an extremely well-

ward a more creative environment, Loren maintains. "We move faster here," he says. "The idea moves things ahead. There's less concern for the way in which you do it, who said it and how it was said."

Loren likens the atmosphere to a journey without a destination but with a series of milestones along the way. "There are a lot of people here who don't know their limitations and aren't interested in finding out what they are," he says.

Where we got the idea that something small
could be powerful.



Baxter

FROM PAGE 107

can Hospital Supply's human resources system was chosen as the one the combined organization would use, one person in the human resources area quit.

In July 1985, Baxter Travenol, with \$1.9 billion in annual sales and 31,000 employees, offered to buy American Hospital Supply, which also had 31,000 employees but \$3.5 billion a year in sales. The deal was completed in November that same year.

Drive for distribution

A driving force behind Baxter's offer was acquiring American Hospital Supply's marketing, distribution and information systems, according to Heschel and John Parker, who was then the top systems executive at American.

For more than 10 years, American had pumped \$70 million into systems for processing orders, primarily its celebrated ASAP order-entry system, which had boosted market share by allowing hospitals and other American Hospital Supply customers to order supplies through terminals in their offices. On the other hand, Baxter Travenol was ahead of American in develop-

ment tools and end-user computing, Heschel said.

But Baxter Travenol was not content with acquiring technology. Its corporate management set goals of cutting the budget of the combined companies 25%, including a 20% payroll reduction, for a savings of about \$400 million.

The plan called for Information Resources to cut its consolidated budget by about \$15 million a year over three years by trimming staff, closing facilities, consolidating systems and renegotiating contracts.

Moving managers

Heschel, who had been American's Hospital Supply's vice-president for management services, was given the top information systems job principally because of the importance of ASAP. Parker, who had been with Baxter Travenol and in the health care industry for a little more than a year, said that decision was appropriate. "It was fairly clear that the senior MIS guy from American was going to be the senior MIS guy. I can't argue with that decision," Parker said.

After the merger, Parker worked as the No. 2 Information Resources executive, then moved to Baxter Travenol's

Hospital Information Systems Group, a vendor of hardware and software for hospitals, as vice-president and general manager of the facilities and service division. In May, he left the company for Squibb Corp., where he is now vice-president for information resources.

Heschel said his first task was getting the two organizations together; the second was generating synergies. He began planning the consolidation before the acquisition closed, meeting with key users and top information systems managers from both companies. He formed user committees from both companies and had systems personnel from each organization meet those from the other one.

Another early move — designed to instill confidence in customers, top management and the staff — was creating the appearance of a consolidated order entry system with superficial links. On Feb. 1, 1986, the company began taking orders from pre-merger Baxter Travenol customers through ASAP.

"That was a real hit and a real shot in the arm," Heschel said.

Trimming staff

In reducing staff, Heschel chose the six managers who would report to him through interviews

and consultation with Parker, who agreed with his choices. "From there, it went right straight down the line. Each manager then formed his organization or her organization," Heschel said.

The organization tried to eliminate "lower level performers" and keep the best people for given jobs regardless of which company they came from, he claimed. Parker agreed that was the intent. To date, Information Resources has let go of roughly equal numbers of former American Hospital Supply and Baxter Travenol employees, according to Heschel, a development he called "uncanny."

Grouping systems

Baxter Travenol is consolidating the three Illinois data centers that the two companies operated. It has closed the one-time American Hospital Supply backup site in Evanston and is shutting down the former Baxter Travenol facility in Deerfield, relying on American's former main site in McGaw Park.

In consolidating systems, Information Resources sought the best of what each company offered, according to Heschel. The major obstacle was the unexpected degree of "pride of ownership" among users and devel-

opers. "The process of selecting between the two became much more rigorous, time consuming and political than I had thought it might be," Heschel said.

The solution lay in the user committees he had set up, which made the decisions. "So it was palatable and tolerable from that perspective. But there was a lot of pushing and shoving that went on," Heschel said.

Two other major issues arose in consolidating systems. Once one system was selected, the users of the rival system seemed to request enhancements "that seemed to be a lot more than was necessary," Heschel said. And a budget crunch arose from the need to run two systems for a while and then enhance one.

"On one hand, I've got users who are trying to get as much as they can and not give up anything," Heschel said. "On the other hand, I've got top management saying, 'Look Heschel, you've got to get these systems combined to save money.'"

Summing up his experience, Heschel said he was not sufficiently prepared for political concerns and the difficulty of resolving them. "I didn't see some snakes in the grass," he said. "It took a lot of glasses of beer at the local pub to get people relaxed enough to talk about things."

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'CIO'

FROM PAGE 107

tion politics standpoint, you have to be sensitive to grabbing onto that; it may have a negative reaction among your peers," said Cooke, who holds the title of general manager of the information systems division at The Sun Co.

Cooke added that the term CIO may be practical in discussions among information systems people to quickly convey who the top information executive is. And consultants love it because it sounds more important, he said. "It's a very convenient handle or cliché to use that grabs people's attention," he said.

Darwin John, corporate

vice-president for information systems at Scott Paper Co., echoed Cooke's comments on the CIO tag. "I think it probably has gotten glamorized to the point where it is perceived as self-serving," he said.

John was appointed CIO in 1985 but gave up that title during a reorganization 1½ years later, although he continued to help set the company's strate-

gic direction. The title seemed to be distracting and not accomplish anything, John said.

Further fueling this line of thought, within the small mountain of mail awaiting my return from the conference in Seattle, was a statement from a well-known recruiter of information executives castigating the CIO title and, to some extent, the concept underlying it.

Herb Halbrecht, the recruiter, reported that a survey sent to hundreds of chief executive officers found that many of them think the CIO title is mostly self-serving hype. Using it might expose an executive to "all kinds of garbage" within the company, and the best people eschew it, Halbrecht said in a conversation on his findings.

The CIO concept does have some degree of validity, which varies among industries and companies, Halbrecht allowed, and younger, less computerphobic chief executives are interested in it. But while the role of the information executive is increasing, it is not always doing so to the extent that the MIS people want, he noted.

Halbrecht said some observers believe 40% to 50% of those who do become CIOs will not come from the ranks of information systems managers, although they'll have an interest in information technology, be "snow proof" concerning it and, perhaps, even have a passion for it.

Halbrecht's own view on who will make the CIO grade: "I will charitably say 25% of MIS directors will make it." These, he added, are the "super people" who would reach the top level of management no matter where they started, on the basis of their capabilities, style, charisma and general business smarts.

Ludlum is *Computerworld's* senior editor, management.

CALENDAR

NOV. 15-21

Central Prime Users Group Eleventh Annual Meeting. St. Charles, Ill., Nov. 15-17 — Contact: CPUG, 4N165 Wood Dale Road, Addison, Ill. 60101.

International Geographic Information Systems Symposium: The Research Agenda. Arlington, Va., Nov. 15-18 — Contact: E. H. Pechan & Associates, Inc., 5537 Hempstead Way, Springfield, Va. 22151.

Information Industry Association's 19th Annual Convention & Exhibition. Chicago, Nov. 15-19 — Contact: IIA, 555 New Jersey Ave. N.W., Washington, D.C. 20001

The Canadian Computer Show. Toronto, Canada, Nov. 16-19 — Contact: TCS, 20 Butterick Road, Toronto, Ont., Canada.

Fifth National Conference on EDP Software Maintenance. Washington, D.C., Nov. 16-20 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

CAP '87. Chicago, Nov. 17-19 — Contact: Computer Aided Publishing, 90 W. Montgomery Ave., Rockville, Md. 20850.

Fifth Computer Symposium for Local Government. Brainerd, Minn., Nov. 18-19 — Contact: Government Training Service, Suite 202, Minnesota Building, Fourth and Cedar Streets, St. Paul, Minn. 55101.

NOV. 22-28

Forth Modification Laboratory Conference. Pacific Grove, Calif., Nov. 27-29 — Contact: Forth Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

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INDUSTRY INSIGHT

Stanley Gibson

IBM rolls out the big guns



If there is one thing more intriguing than trying to guess when IBM will do something, it is trying to guess afterward why the firm did it.

This was never more evident than at the joint meeting of the Computer Dealers and Lessors Association (CDLA) and the European Computer Dealers and Lessors, held recently in Bermuda.

The fact that many CDLA members are former IBMers makes the game even more fun, because each of them believes he has unique insight into the psyche of his former employer.

To a group that was already preoccupied with some of Big Blue's aggressive policies, IBM director of industry relations Ambrose Carr announced that IBM will offer free 24-hour, seven-day-a-week service to all IBM Maintenance Agreement customers. He also said that time and materials maintenance will be offered only during working hours.

In addition, Carr said IBM will deinstall and reinstall IBM equipment at no charge to the customer, provided that the equipment is placed under maintenance agreement at the new location and that it is displaced by new IBM gear. He added that equipment deinstalled and reinstalled by others will not be recertified for IBM maintenance at IBM's expense, as had been the former practice.

Harry Kavetas, president of IBM Credit Corp., told attendees IBM will continue to sell some formerly leased machines but that it will also continue to be the computer dealers' major supplier.

Reasoning why

In the wake of the pronouncements, different theories emerged as to why they were made.

One view is that the maintenance announcements were aimed directly at third-party maintenance companies — to cripple them by forcing them to cut margins to the bone. And

Continued on page 119

Sun basks, aims to avoid burns

Analysts laud stunning growth but say firm must broaden base

BY JULIE PITTA
CW STAFF

MOUNTAIN VIEW, Calif. — Jaded computer industry watchers, witness to countless spectacular rises and staggering falls, find it hard not to like Sun Microsystems, Inc. In fact, their gentle criticism sometimes sounds like quibbling for quibbling's sake.

"There are always weaknesses in any company," said Brad Smith, an industry analyst at Dataquest, Inc. "Are they running too fast? Can they maintain the pace? We don't have answers to those questions yet."

"Any company that has grown the way they have is hard

to find fault with," conceded Andy Rappaport, an industry analyst with the Boston-based Technology Group. "It's hard for me to say they have made mistakes."

In the five years since it was founded, Sun has spurted from \$86,000 in revenue its first year to \$537.5 million in fiscal 1987.

More importantly for the industry, Sun has established a trend toward low-cost graphics systems based on industry-standard hardware and software like the Motorola, Inc. 68020 microprocessor and the Unix operating system. That approach helped it gobble a share of the market previously dominated by



Scott McNealy

Apollo Computer, Inc.

Sun's stellar performance has all but silenced the critics, but it does not diminish the challenges that lay ahead.

To maintain its rapid growth, Sun must protect its core business while moving into new arenas, and it must stave off competitors that will find Sun's use of standard hardware and software inviting.

Sun's 33-year-old President and Chief Executive Officer Scott McNealy said he does not worry about an onslaught of clone makers combining off-the-shelf components and offshore manufacturing to build cheap Sun knockoffs. Rather, McNealy maintained that Sun welcomes clones, saying that clones offer further incentive for third par-

ties to develop for the Sun platform.

Sun has even gone a step further, offering its Scalable Processor Architecture (Sparc) to its competitors. "Licensing means royalties, so when you lose, you win," McNealy said.

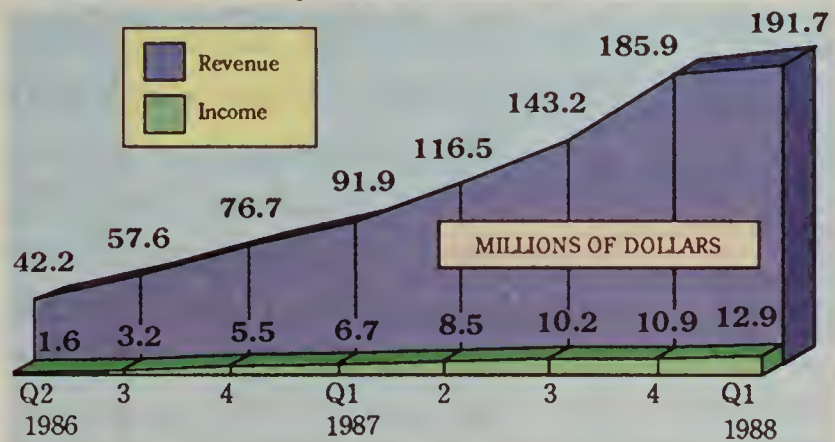
Even AT&T has jumped on the Sparc bandwagon. Late last month, the communications giant announced that it will license Sparc, which is based on reduced instruction set computing, for a future line of workstations and minicomputers. Arete Systems Corp. has also signed on to Sparc for a line of workstations due late next year.

McNealy said Sun will maintain the delicate balance of an open architecture and a competitive advantage by moving the target of technology. He said Sun spends between 13% and 14% of its revenue each year on research and development. "IBM put no R&D dollars into the PC — there's no networking, no applications, no value added," McNealy continued.

Continued on page 118

House of the rising Sun

Two years of breakneck growth have taken the industry by storm



INFORMATION PROVIDED BY SUN MICROSYSTEMS, INC.
CW CHART

CDLA faces Blue threat

IBM round-the-clock maintenance offer shocks

BY STANLEY GIBSON
CW STAFF

SOUTHAMPTON, Bermuda — The Computer Dealers and Lessors Association (CDLA) met here recently in the aftermath of the Wall Street crash, but attendees were not as obsessed with the effects of the market debacle as they were with some aggressive marketing moves being made by IBM.

"A healthy IBM is a great competitor to have. A hungry and behind-quota IBM is a very difficult competitor to have," said Richard Forsythe, chairman of CDLA's IBM relations committee.

IBM is employing several different policy changes to compete more aggressively with third-party dealers, lessors and servicers. IBM's director of industry relations, Ambrose Carr, dropped a bombshell at the conference by telling attendees that

all IBM Maintenance Agreement customers would be granted 24-hour, seven-day-a-week service at no extra charge.

Earlier this year, round-the-clock-service was given to customers under IBM's Corporate Service Amendment plan. Carr outlined other IBM policy changes that are seen as offering a boost to new equipment sales.

In addition, IBM Credit Corp. President Harry Kavetas confirmed to CDLA members that IBM salesmen have been reselling used equipment from expired IBM Credit leases to its customers and will continue to do so. That practice, first hinted at to CDLA members last spring, reverses a long-standing IBM policy of reselling those computers into the third-party aftermarket.

There were also reports among CDLA members that IBM is offering all 3090E models under the six-month deferred

Continued on page 118

Yen and now: Toshiba laptop exports halved by chip tariff

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Semiconductor tariffs imposed on Japanese vendors cut exports of Toshiba Corp. laptop computers in half during the six months ended Sept. 30, Toshiba announced recently.

The tariffs imposed earlier this year by the U.S. Department of Commerce have prevented Toshiba from shipping finished laptops to the U.S. since the beginning of this fiscal year. That knocked exports of those products down to \$48.3 million during the six-month period, compared with laptop exports of \$110.3 million in the previous six months.

"The export of laptops to the U.S. halved after the trade sanctions because we had to ship components [for assembly] rather than finished products," said Toshiba spokesman Keisuke Oh-

mori. "The value of components is much lower than that of the finished products."

The U.S. government, charging that Japanese vendors are guilty of unfair practices in semiconductor trade, imposed punitive 100% tariffs on Japanese 16-bit microcomputers shipped to the U.S. [CW, April 27].

Ohmori said the company is now selling 5,000 16-bit models assembled in the U.S. monthly, half the number sold before the tariffs took effect. "The longer the problem drags on, the harder the damage will be," he said.

President Reagan last week authorized the removal of some anti-Japanese tariffs this week, but tariffs on laptop computers and some desktop computers will remain. The lifting of sanctions on low-performance 16-bit computers came in response to evidence that Japanese firms

Continued on page 118

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Andersen adds software marketing division

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — In a further attempt to bill itself as a major computer software and services firm, Big Eight consultancy Arthur Andersen & Co. recently announced that it will sell applications development tools and vertical market applications directly to end users.

Heading the firm's Software Marketing Organization is R. E. Rutledge Jr., the former marketing director for IBM's National Accounts Division in White Plains, N.Y.

Until now, sales of Andersen's software were made under custom contracts with its consulting business. A small direct sales force of 25 representatives, many of whom are recent retirees from

IBM, is being deployed in the U.S. and Canada, Rutledge said. A larger sales force is being hired, he added, with many product managers assigned to Europe and Asia.

"Our clients have told us that they want both software products and application development tools," Rutledge said, "and we believe that selling them these products will not interfere with Arthur Andersen's consulting relationship."

The new software division is part of Andersen's Management Information Consulting Division (MICD).

The move comes as Andersen's entire consulting practice is being reorganized

along regional lines.

MICD, the consulting portion of the large auditing firm's \$2.3 billion annual business, employs 11,000 and generated revenue of \$840 million in the year ended Aug. 31.

A few products announced

Andersen's consultants have already developed many vertical market applications in banking, finance and insurance that could be adapted for off-the-shelf sales. So far, only a few software products have been announced, including an IBM DB2 development tool kit called Foundation, a materials requirements package

called Mac-Pac and a distribution control system.

Mel Bergstein, a managing director of MICD, claimed that Andersen's software offerings will not compete directly with products from independent applications leaders Management Science America, Inc. or McCormack & Dodge Corp. Both those firms have signed joint customer support agreements with Andersen, Bergstein said.

"We are interested in building the highly complex, competitive vertical market software applications," Bergstein said. "We are not interested in competing with cross-industry packages."

Bergstein said Andersen's largest software competitors are IBM and Electronic Data Systems Corp.

CEOs McTavish, Cavalier enter new positions

Two former chief executive officers from the applications software industry were named to CEO positions at new companies in separate announcements last week.

George L. "Larry" McTavish, who resigned as chairman and CEO of Hogan Systems, Inc. last summer, was named president and CEO of Comdata Holdings Network, Inc., the New York-based corporate parent of data communications equipment firm Comdata Network, Inc.

Separately, former NCA Corp. President and CEO John C. Cavalier became president and CEO of Britton Lee, Inc., with cofounder David L. Britton giving up those titles but remaining chairman.

Irreconcilable differences

McTavish resigned from Hogan in July because of differences with the board over the company's direction.

His departure from the Dallas-based banking software house surprised most industry observers. McTavish was credited by many for reviving Hogan's sagging fortunes and engineering the company's exclusive 20-year licensing deal with IBM.

Comdata Holdings was formed earlier this year as the result of a limited partnership of venture capital firms, led by New York-based Welsh, Carson, Anderson & Stowe.

The partnership acquired Morton Grove, Ill.-based Comdata Network for \$314.2 million. Welsh, Carson principal Patrick J. Welsh had been interim president of Comdata Holdings until McTavish's appointment.

Cavalier left NCA after the Santa Clara, Calif., vendor of manufacturing software for minicomputers was acquired by Ask Computer Systems, Inc.

Britton Lee also named NCA's former chief financial officer, Peter J. Cassidy, to replace cofounder Geoffrey M. Lee as executive vice-president.

The move removes Lee from daily operations, although he remains on the Britton Lee board. Cassidy will also be the company's chief financial officer.

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Corvus may face delisting

BY PATRICIA KEEFE
CW STAFF

SAN JOSE, Calif. — Financial pressures continue to mount for beleaguered Corvus Systems, Inc. Despite recently reporting the barest profit of 1 cent per share for its first profitable quarter in nearly three years, the networking vendor was hit with more negative financial news in October.

Following a recent review of Corvus's books for the fiscal year ended May 31, the National Association of Securities Dealers (NASD) notified the firm that it failed to meet the capital-and-surplus requirements for quotation in the NASD Automated Quotation (NASDAQ) system. NASD told Corvus that its common stock will continue to be included for quotation in the NASDAQ system via an exception from the capital-and-surplus requirement.

NASD granted a temporary exception effective until Jan. 15 from this standard, subject to Corvus meeting certain conditions. But in a prepared statement, the company said "there can be no assurance that [Corvus] will do so."

Last month, Corvus reported a net profit of \$273,000 on sales of \$8.2 million for the fiscal quarter ended Aug. 31. That compares with a net loss of \$3.9 million, or 13 cents per share, for the like period last year. Sales were \$8.2 million, down from \$12.4 million for the comparable period in fiscal 1987.

The profit was attributed to a change in new product strategies, higher gross profit margins and cost-reduction programs. Corvus President and Chief Executive Officer Lewis T. Lipton noted in a statement that gross profit margins increased to 45% from 29% in the year-earlier quarter.

NICKELS & DIMES

Software & Services

Hogan Systems, Inc. reported a net loss of \$2.8 million, or 19 cents per share, on revenue of \$10.4 million for the second quarter ended Sept. 30. This compares with a net profit of \$2 million, or 13 cents per share, on revenue of \$10.8 million for the like period a year ago.

Ask Computer Systems, Inc. reported revenue for the first quarter ended Sept. 30 of \$26.6 million, compared with \$20.3 million a year ago. Profits were \$1.9 million, or 14 cents per share, compared with \$1.2 million, or 14 cents per share, for the like quarter last year.

Software Publishing Corp. announced revenue for the year ended Sept. 30 of \$38.6 million, compared with \$23.7 million last year. Profits were \$5.2 million, or 69 cents per share, compared with \$700,000, or 10 cents per share, in the previous year. Revenue for the fourth quarter was \$10.7 million, compared with \$6.4 million in the year-earlier quarter. Net income increased to \$1.5 million, or 20 cents per share, from \$454,000, or 6 cents per share.

Computer Task Group, Inc. announced revenue for the third quarter ended Sept. 30 of \$43.2 million, compared with \$36.5 million in the previous year. Profits were \$1.3 million, or 17 cents per share, compared with \$1.2 million, or 16 cents per share, in the like period a year ago.

Businessland, Inc. reported revenue for the quarter ended Sept. 30 of \$180 million, compared with \$129.7 million last year. Profits were \$3.7 million, or 15 cents per share, compared with \$1 million, or 4 cents per share, in the comparable quarter last year.

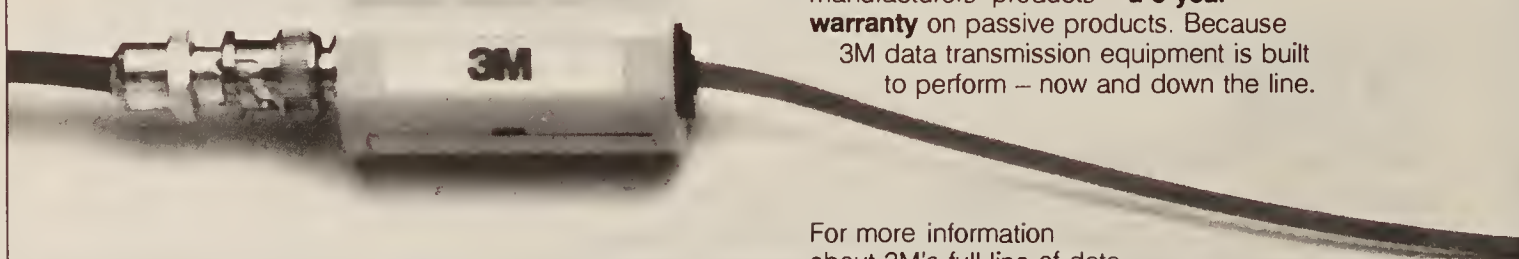
Sungard Data Systems, Inc. announced net income for the third quarter ended Sept. 30 of \$2.1 million, or 20 cents per share, compared with \$1.6 million, or 18 cents per share, last year. Revenue was \$22.5 million, compared with \$16.9 million reported last year.

First Financial Management Corp. reported net income for the third quarter ended Sept. 30 of \$3 million, or 28 cents per share, compared with \$1.4 million, or 18 cents per share in the like period a year ago. Revenue was \$29.4 million, compared with \$15.5 million for the same period last year.

Intellicorp, Inc. announced a net loss of \$649,000, or 9 cents per share, for the first quarter ended Sept. 30, compared with a net loss of \$850,000, or 12 cents per share, in the like period last year. Revenue was \$5.1 million, compared with \$4.1 million in the comparable quarter last year.

Comshare, Inc. reported a loss of \$946,000, or 35 cents per share, for the quarter ended Sept. 30, compared with a profit of \$503,000, or 18 cents per share, for the same quarter a year ago. Revenue for the quarter was \$17.3 million, compared with \$16.8 million last year.

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CDLA

FROM PAGE 113

payment plan officially announced only for the low-end models 150E and 120E. One attendee reported he had competed against a 400E under the six-month deferred payment plan, while another reported he had heard of a 600E being sold under those terms.

Other attendees complained of stiff competition resulting from the officially announced 4381 Special Installation Option, under which a user is granted a discount by taking delivery of a current 4381 model and having it upgraded to an enhanced model when those machines start shipping in the first quarter of 1988.

Taken together, IBM's moves gave CDLA members an image of a ravenous industry giant out to gobble up every sale it can by whatever means it can.

Forsythe said all the moves are geared to accelerate hardware sales in the fourth fiscal quarter, a traditional practice at IBM.

"In the fourth quarter of every year, competitive activity between us and IBM increases. Everyone is trying to make the 100% club by the end of the year," he said, referring to IBM's salesmen's quotas. "There are no rules. The gloves are off."

Amid wide reports among attendees that IBM is selling IBM

Credit's used equipment to users, IBM Credit's Kavetas confirmed that practice, saying that IBM is selectively marketing some used equipment and will sell more in the future than it has previously.

Nonetheless, Kavetas said IBM still wants to be the major source of used equipment for brokers and dealers. He said the practice of reselling former lease machines to customers was dictated by IBM taking possession of a much higher number of machines coming off leases than in the past.

Pleasant aftershock

Attendees generally expressed the view that corporate belt-tightening resulting from the harmful aftershocks of the stock market plunge will tend to help used-equipment sales.

"If there is cost cutting in U.S. corporations, then that is good for us," said CDLA Chairman Bob Gulko, president of Unicom Computer Corp. in Sausalito, Calif. "In good times, do lease origination, in bad times, remarket used equipment," he said.

Other prominent CDLA members said the general trend toward mergers among computer lessors will continue.

"You need to be larger," said Olie Swanky, president of Bell Atlantic Systems Leasing International, Inc. in Phoenix. "IBM is much more competitive in 100 different ways. It helps to be larger in order to compete."

Sun basks

FROM PAGE 113

"It's no wonder that Korea, Inc. was able to clone the PC."

How Sun will broaden its base is still a question. Speculation has Sun entering the personal computer market some time within the next few months. However, Sun officials are cagey about their plans for that crowded platform.

"I don't think it's clear to us that we need a product that's 80286- or 80386- based," said John Hime, Sun's hardware marketing director, referring to Intel Corp.'s microprocessors. Hime also acknowledged, "PC-ness is a very important part we have to deliver. PC-type applications have to be available on our platform at a low cost."

But with personal computer firms like Compaq Computer Corp. and Apple Computer, Inc. moving upward into the technical workstation area, some industry analysts said Sun will try to compete in the low end of the desktop market.

"The issue is called entering the IBM world, which means bridging between Unix and DOS," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. "There is probably no more elegant way to do that than with the 386. Sun wants to break out in more commercial markets. You can't do that without DOS."

Sun is also facing both an opportunity and a problem in Mi-



Sun cofounders Andy Bechtolsheim, William Joy and McNealy

crosoft Corp. and IBM's OS/2 operating system, which presents an attractive alternative to Unix for some developers. However, Microsoft MS-DOS applications will have to be substantially rewritten to run under the next-generation PC operating system.

"Software developers have to do a lot of recoding to migrate MS-DOS applications to OS/2," Dataquest's Smith said.

'The real kicker'

Rappaport called the OS/2 vs. Unix battle the "real kicker. . . . Unix is so technically oriented and unwieldy," he explained. "There's resistance to it in the mainstream of the computer world. It would be a mistake for Sun to think it's a Unix supplier rather than a cost-effective high-end computer supplier."

For his part, McNealy said he prefers to ignore such speculation. Sun's CEO said he sees the company's greatest challenge as changing users' concept of com-

puting from that of the traditional terminal hooked to a mainframe to distributed computing.

"There are desktop computers, networks and servers in the distributed computing environment," McNealy explained. "That's a new concept."

Sun is promoting its distributed computing view with a package of hardware, software and network management services it calls Open Systems Network.

Sun's advertisements feature an assortment of PCs, Apple Macintoshes, Digital Equipment Corp. VAXs and IBM machines communicating over various media and industry-standard protocols, with Sun servers and workstations sprinkled across the network.

"Sun allowed itself to be called a workstation company because it allowed us to raise a lot of cash," McNealy admitted. "I hate to destroy the myth of the workstation, but what people need is distributed computing."

Yen and now

FROM PAGE 113

have stopped dumping memory chips in third-country markets.

Toshiba, in addition, still faces the threat of further trade sanctions from the U.S. Congress over a subsidiary's illegal sale of advanced milling equipment to the Soviet Union [CW, July 6].

Ohmori said that despite periodic reports that Congress is softening its stance, the company has seen no noticeable change regarding potential sanctions.

As part of a package of trade legislation, Congress is considering a two- to five-year ban on Toshiba imports.

Ohmori said he does not expect a final decision until next February or March, because Congress will recess after the Thanksgiving holiday.

Despite the laptop falloff, Toshiba reported strong overall sales and earnings for the six-month period. Net income for Toshiba, excluding its subsidiaries, climbed to \$109 million, a figure 36% above the corresponding period last year. Sales increased 10% to \$8.78 billion.

Computerworld Washington, D.C., correspondent Mitch Betts contributed to this report.

Apollo exec joins Sun

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. pulled off a major hiring coup last week by appointing the former top marketing executive of archrival Apollo Computer, Inc. to its own top marketing position.

Edward J. Zander, who left Chelmsford, Mass.-based Apollo last month after a reported dispute with corporate management, was named to the new position of vice-presi-

dent of corporate marketing for Sun.

Zander will be responsible for Sun's entire product line marketing strategy and will report to Executive Vice-President Bernard Lacroute.

Zander was Apollo's vice-president of corporate marketing for 5½ years. He left Apollo after rejecting an offer to be vice-president of strategic planning as the firm reorganized its marketing group.

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Big guns

FROM PAGE 113

with time and materials maintenance no longer being offered by IBM at night and on weekends, third parties will not be able to call IBM at those times when they can't fix a problem.

A view of IBM selling machines that it previously leased holds that IBM aims ultimately to be the largest dealer of used computer equipment in the world.

One view of the deinstall/reinstall announcement is that IBM aims to torpedo the reconfiguration and refurbishing industry.

A unique theory holds that IBM did not act in its own interest by making life more difficult for others. The line of reasoning goes like this: Because the used

THE MOST important thing to keep in mind is that whatever IBM does, it is trying to sell more computers — to move more iron.

equipment market is necessary to new IBM equipment having a residual value, hurting maintenance companies that service mainly older equipment makes any IBM equipment less attractive to own.

And how could IBM make money reselling its own formerly leased machines if there is no one to maintain them? Does this mean IBM will start to offer reasonable maintenance prices on older machines? IBM's constant raising of those prices has traditionally pushed users toward buying new equipment.

Why, indeed, would IBM wish to crush maintenance companies? The answer, according to many attendees, is that IBM is concerned with the size of the acquirers of several leasing companies, such as Bell Atlantic and Bellsouth.

These companies, with billions of dollars in revenue, are a far cry from the many mom-and-pop maintenance outfits that populate the industry.

Olie Swanky, president of Bell Atlantic Leasing, confessed that he now, as part of Bell Atlantic, gets very favorable lending rates from banks. Swanky was previously with Greyhound Leasing before it was acquired by Bell Atlantic.

IBM no doubt reasoned that it was time to show the Baby Bells who's boss.

That makes sense. But some observers said it is the small companies that will be hurt the most, not the large ones that have the resources to ride out the storm. But if there are fewer

smaller companies, then the larger companies will not be able to grow by acquiring them; they will have to grow by offering better value.

But the most important thing to keep in mind is that whatever IBM does, as some CDLA members stressed, it is trying to sell more computers — to move more iron.

Reducing the cost of maintenance and moving the machine

for a customer after he is finished with it effectively reduces the cost of owning new equipment. And we ought not to forget that this summer, IBM eliminated shipping charges, another price-reducing move.

But, in the end, is IBM's moving of more iron good for the customer? We are in the middle of a period in which IBM will be

testing the will of all of its competitors as never before. But IBM is also testing the will of customers who say they are in control of their own accounts because they insist on having a choice of equipment and maintenance providers.

The typical weakness of customers was described clearly by one CDLA official: "Customers want to shop around, get com-

peting bids and then buy from IBM." A world with one maintenance provider and one vendor of used equipment, if that should result from IBM's moves, would mean account control by IBM as never before. Few customers would admit that is in their best interest.

Gibson is a *Computerworld* senior writer.

How to Buy Time for Your IBM 308X.

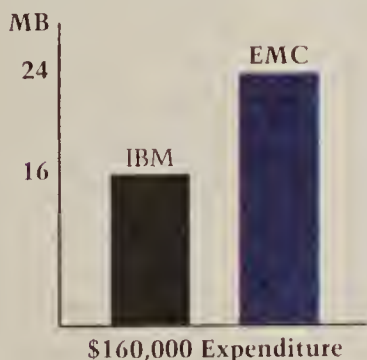


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COMPUTER CAREERS

Meeting new end-user demands

Patient, savvy professionals needed to face information center challenge

BY DENA ALLMAN
SPECIAL TO CW



For MIS professionals who would rather work with users than with technical specifications, the information center provides ample opportunities. But it is not as easy to be an information center professional as it once was. Today's sophisticated user population demands more than just hand-holding through a spreadsheet program. Users want access to mainframe data and the ability to create their own applications.

This trend not only requires more sophisticated information center staff members but is also changing the nature of the centers. In some cases, rather than make the center a stand-alone self-supporting entity, companies are implementing mini-information centers within individual departments.

A sympathetic touch

Despite the increased technical ability required for information center professionals, the primary characteristic employers still seek in candidates for such positions is understanding end users.

Respondents to a recent survey of information center man-

agers conducted by Crwth Computer Coursewares in Los Angeles ranked communicating with end users as the top requirement for their employees. DP technical skills and knowledge of the company's business were the next two on the list of staff requirements.

The manner in which the staff interacts with end users directly influences the amount of user productivity. Since the average information center manager may need to deal with up to 250 end users, more than adequate communication skills are crucial.

"We look for people with good professional education skills, such as teaching," says Daniel Ward, manager of office systems at Marine Midland Bank in Buffalo, N.Y. "These people have had practical experience in training and talking with people."

For Jim DeFoor, estimating project administrator for General Dynamics in Fort Worth, Texas, attitude is everything when it comes to becoming an information center staff member. "Candidates should be interested in the substance of the end user's task and enjoy learning about new technical developments," he says.

In addition, says Steven Rood, internal staff consultant for General Foods, Inc. in White

Plains, N.Y., a good information center professional must have patience because the center deals with so many types of people, from the novice to the advanced end user. "The staff member must be able to adapt to

CANDIDATES should be interested in the substance of the end user's task and enjoy learning about new technical developments."

JIM DEFOOR
GENERAL DYNAMICS

these different stages of end-user experience and interpret their individual needs," Rood says.

Expanded horizons

A position in the information center allows DP professionals to become involved in a wider variety of projects.

Karen Patterson, information center specialist for San Diego-based DP Corp., says that since projects are less time-consuming than standard DP efforts, the information center employee can work on several projects at once and get better acquainted with different areas of the firm's business.

Adds Ward, "Because of the

way we help users approach situations, the staff members enjoy a less structured atmosphere with more flexibility than other DP areas."

Sixty-five percent of information center staff employees are hired from other areas of MIS, according to the Crwth survey. Instead of promoting regular information center staff members to fill management positions, Ward says Marine Midland Bank

information center, Patterson says. The Crwth survey found that end users make up 47% of those in information center staff positions.

According to General Dynamics' DeFoor, DP professionals who want information center jobs should work with the company for at least two years to become familiar with its business.

Schooled in the basics

It is essential for information center employees to possess an adequate understanding of mainframe, minicomputer or personal computer operating systems, as well as spreadsheets, word processing and graphics. "The center staff must be able to anticipate user questions and give them an idea of what is available from systems development," Rood says.

Staff members should become "functional specialists" in all their company's systems, DeFoor says. When new systems are developed, it is their job to learn them quickly.

Although compensation varies depending on the center and company size, most information center managers earn between \$40,000 and \$55,000 per year. Trainers earn between \$20,000 and \$35,000 per year. Data analysts and programmers can expect to earn \$25,000 to \$40,000 per year, and administrators' yearly salary can range from \$15,000 to \$35,000.

Allman is a free-lance writer based in Chicago.

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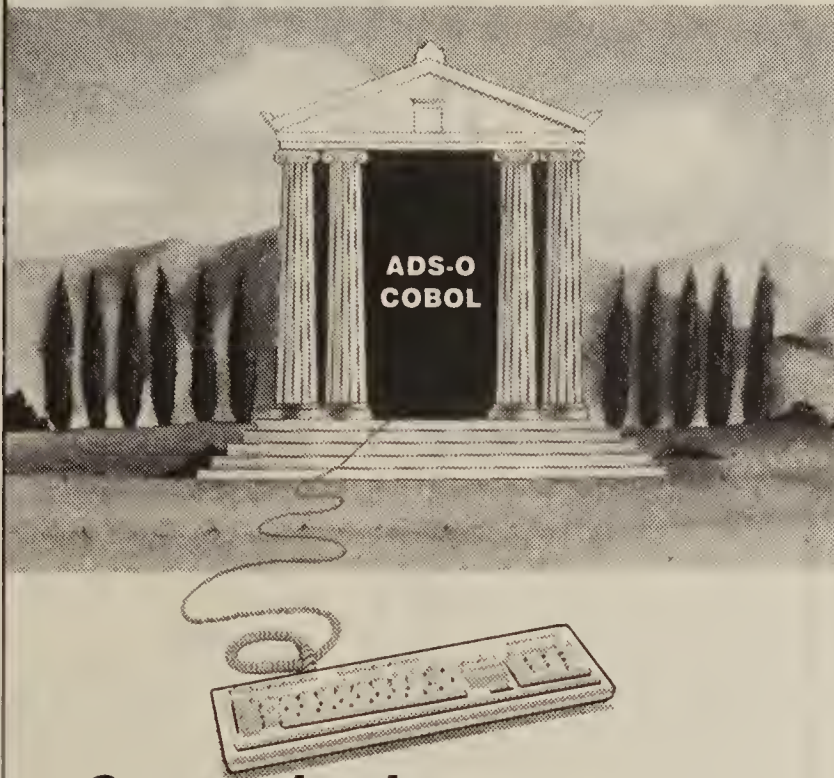
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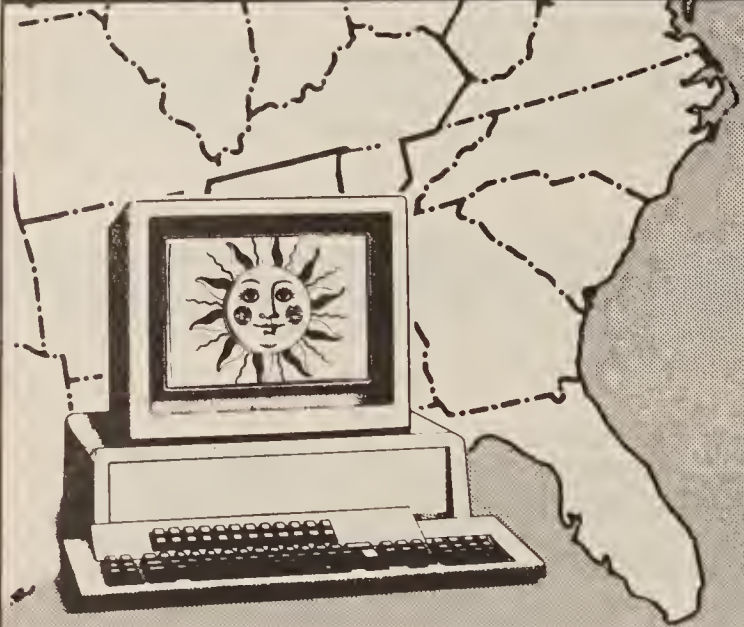
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Through our screened & selected affiliates, we'll get your resume to employers with applicable job openings in your targeted geographic areas. **Openings for systems software & applications programmers & analysts & HW/SW engineers.** No fee, contract or obligation. At least two years experience required. U.S. citizens & permanent residents only. Send resume to:

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Ref. CW, 3100 W. Chapel Ave.
Cherry Hill, NJ 08002
(609) 667-4080

MPI is a direct marketing agency located in Marina del Rey, CA. We currently have openings for Programmer/Analyst who meet the following requirements: Minimum 2 years business applications experience using FORTH programming language under a CYBOS operating environment. Previous VM/CMS experience is desired.

If you're interested in getting in on the ground floor of a challenging new travel system, with a dynamic growing subsidiary of United Airlines, please send your resume and salary history to: MPI, P.O. Box 11149, Marina del Rey, CA 90292, Dept. 163. Equal Opportunity Employer.



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RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM Cobol; CICS; IDMS; IMS; Adabas; Oracle; DB2; SQL; ADR Datascom or Ideal; VM; CMS; Nomad; Financial; Mfg.; Banking; ATM; Claims Processing; MRPII; MSA; MVS; ACP; IMS or CICS Systems Progs; Capacity Planners; Best-1; Telecom Analysts; DB Analysts; Info Center Analysts; S. 38 RPG III; DEC/VAX Mfg. or scientific; DG; Tandem; Method 1; Spectrum 2; SDM; Pride. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024

DESIGN ENGINEER. Assists in definition of High Speed Computer Network protocol; designs and develops ECL and TTL hardware Network interfaces, including hardware implementation of lowest protocol layers and interface to mainframe computer and integrating into ASIC design; design and implement hardware simulation to insure design correctness and system performance; perform research into high speed, long distance analogue signal transmission and development and characterize parallel data transmission schemes. Req. B.S. or equivalent in Elect. Engineering plus 2 years exp. in the logic design of large scale high speed Mainframe Computers. Also requires the following: design exp. in ECL and TTL logic families; high speed gate array or ASIC design exp.; exp. in design of high speed analogue transmission lines, signal characterization, modelling and simulation; exp. in digital logic system simulation and simulation software design; and exp. with current elec. CAD systems. Salary \$42,000/yr. Send this ad and a resume to: ATTN: Human Resources Dept., Scientific Computer Systems Corporation, 10180 Barnes Canyon Rd., San Diego, CA 92121 no later than November 19. E.O.E.

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A top income on career opportunity for professional field sales personnel selling local area networks to OEM's and Fortune 1000 end users.

We are an established designer and manufacturer of LAN equipment undergoing a major expansion in new product introduction and sales. A good working knowledge of data communications, microcomputers, or LAN's, and willingness to travel is required.

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TCL Inc.
47621 Westinghouse Dr.
Freemont, CA 94539

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2 + years experience in any of the following:

- IBM COBOL/CICS
- DLI
- IMS DB/DC
- System 38
- DEC VMS

Integrated Computer Services
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Suite 2518
Memphis, TN 38137
(901) 761-7812

Senior Computer Professionals

with backgrounds in Software Architecture & Engineering or Software Integration & Testing

LOGICON's Operating Systems Division, a recognized center of excellence for software design and development, is seeking experienced Senior Software Systems Engineers/Software Architects and an Assistant Project Manager/Integration and Test to join its multi-talented technical staff in its Fairfax, Virginia facility.

In addition to strong academic and technical qualifications, these positions require the ability to think, learn and deal with the complexities of very large, multi-processor information systems in a highly dynamic, fast-track environment.

Qualifications for Senior Software Systems Engineer/Software Architect positions include 7 years or more experience in the following areas:

- Strong background in Software Systems Engineering and Software Architecture Design
- Very large scale real time information systems
- IBM 30XX under VM/CMS and MVS
- Background in development of C3I Systems

Qualifications for Assistant Project Manager/Integration and Test include 7 years or more experience in the following areas:

- Hands-on experience with Integration and Test of large scale software
- Current on Technology for Integration Test
- IBM 30XX under VM/CMS and MVS
- Managing Integration and Test Staff
- Executing Test Plans
- Procedures for Formal Integration Test

BS degree in Electrical Engineering, Computer Science or Math is required. Advanced technical degree preferred.

In addition to a very competitive salary structure, LOGICON offers a generous benefits package that includes profit sharing, stock purchase and 401(k) plans, as well as company-paid medical, dental, disability and life insurance.

Qualified applicants should send resume to: LOGICON, 10398 Democracy Lane, Fairfax, VA 22030. Attn: Dept. SE/SA. No phone calls please.

LOGICON

Operating Systems

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- Develop and implement advanced manufacturing systems including material handling, process control, factory data collection and computer aided process planning systems. Requires a BS degree in Computer Science or related field and at least 2 years experience in one of the following: • HP1000, HP9000, VAX8000, MICROVAX • UNIX, RTE, VMS • C, PL/1, FORTRAN • ORACLE, INGRES, RDB, IMAGE • ETHERNET.
- Analyze, design, and code software control systems to develop flexible automated manufacturing systems. Requires a strong background in program development using PL/1 and CICS in an MVS environment. At least 5 years related experience in IBM mainframe software systems development and a related degree is essential. GDDM and SQL relational DBMS knowledge is highly desirable.

APT PROGRAMMERS

APT-AC post-processor implementation and enhancement. Requires 2 years experience in IBM APT-AC software development using FORTRAN, TSO, ISPF, JCL and IBM Assembler and excellent math skills. Background using PL/1 and a BS degree in Numerical Control Technology, Computer Science or Mathematics preferred.

MODEM USERS: You can access a complete listing of career positions now available with your home computer and a modem. Dial **(612) 941-5723** and enter the password "Career Access" for 24-hour information. **Bit settings: data 8, stops 1, no parity, full duplex 300/1200 baud, enter password (Career Access) (CR) upon entry.**

U.S. CITIZENSHIP REQUIRED Northrop is an Equal Opportunity Employer M/F/H/V.

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Requires at least 2 years of experience in a large IBM mainframe environment utilizing OS or MVS/XA, COBOL, TSO, ISPF, JCL, PAN-VALET and IMS DB/DC. Knowledge of COBOL, IMS, DYL/280, 4GL, structured methods a plus. Experience with one of the following systems required.

- **Manufacturing Systems:** Basic knowledge of Purchasing MRP, BOM, INV and SFC systems. Installation and enhancement of MRP II software packages desirable.
- **Financial and Administrative Systems:** Development and enhancement of cost control and configuration management systems using financial software packages.
- **Integrated Logistics Support (ILS) Systems:** Development and enhancement of ILS systems to support provisioning and material supply

Please send your resume to:
Steven Martin, NORTHROP
ADVANCED SYSTEMS DIVISION,
Employment Office, Dept. CW2528,
P.O. Box 1138, Pico Rivera, CA
90660-9977.



NORTHROP

Advanced Systems Division

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Senior Research Engineer, strong C and UNIX. Communications/POS beneficial. **Intermediate Engineers**, same skills, to 58K. **Software Development Engineer**, mid to senior, IBM 370 Assembler, product maintenance, rewrite to C. DOS, OS, VTAM, trouble shooting analyst, 45-48K.

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Hardware Resource Planner, senior, minimum 3 years experience, IBM/Amdahl MVS multiple mainframe shop. Support engineering (CAD), Capacity Planner. User support, planning, budgeting, writing. Give full history of skills. To 51K.

Applications Programmers, 21.6 to 34.8K. IBM/NAS, MVS/SP, PL1, IMS, DBDC (Cobol, Assembler, DYL 260-280, CICS, Roscoe, UFO, TSO/SPF all valuable).

Programmer Analyst and Senior Analyst, same skills as above, to 38.4K.

These and many other mid to senior level data processing positions are now available within our 27-company consortium, including standard benefits packages, most with paid relocation. Please write fully to Mr. Ronald Sampson, Data Processing Projects Coordinator.

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HELP WANTED: System Software Engineer

PLEASE SEND RESUME TO:

EMPLOYMENT SECURITY DEPARTMENT
ES DIVISION, ATT: AEC # 123802
OLYMPIA, WASHINGTON 98504

JOB DESCRIPTION: System Software Engineer, Applications Group. Designs, implements, and tests complex and high level systems and software for microcomputers and processors. Works with other engineers to design WINDOWS applications software, utilizing C and Assembly languages and MS-DOS and XENIX operating systems. Designs and develops graphic-based windowing systems. Will design and adapt WINDOWS software for international sale. Assumes major project responsibility including: 1) requirements and analysis of project specifications; 2) product design; and 3) implementation schedules

REQUIREMENTS: B.A. or B.S. in Mathematics, Computer Science, Electrical Engineering or Physics. Computer software design or programming: 6 months' employment experience utilizing "C" and assembly languages, and designing and developing graphic-based windowing system, and designing and adapting applications software for international sale.

SALARY: \$27,000 per annum. 40 hours per week, flex time.

Position located in Redmond, Washington.

EOE

Data Processing

SENIOR SYSTEMS PROGRAMMER

Commonwealth Aluminum is seeking a senior person for our state-of-the-art installation. One who can support major hardware, software and systems growth.

Must have a minimum of 5 years in-depth experience supporting DOS/VSE systems software, troubleshooting IBM hardware and managing resource usage. The candidate should be able to plan, organize and prioritize projects and have the ability to communicate with both technical and business personnel. VM and CICS experience is a must and ADR product experience is highly desirable.

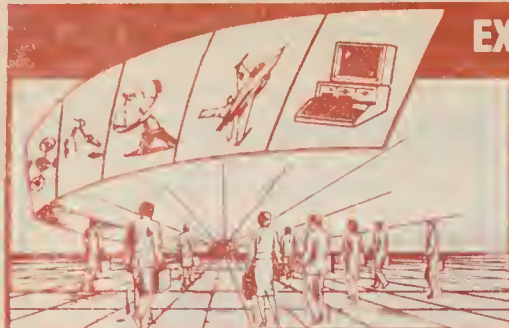
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Computer Partners leads the Professional Services Industry in developing creative business systems solutions for the Fortune 1000.

Our name, Computer Partners, was originally chosen for the firm because of two fundamental beliefs:

- Professionals work best in a partnership environment
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Partly as a result of these beliefs, Computer Partners is now universally referred to as PARTNERS. We specialize in analysis and design projects that offer even greater opportunities for advancement to higher levels of responsibility. Business opportunities include the following:

ANALYSTS/PROJECT LEADERS PROGRAMMER/ANALYSTS

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- **Financial Services** - Development of on-line, real-time portfolio and securities processing systems. CICS.
- **Manufacturing** - Building financial control and distribution systems utilizing DB2 and TELON.
- **Utilities** - Major redesign and implementation of state-of-the-art customer information systems. IDMS, CICS, IMS.

PROGRAMMERS

Designing and implementing applications in the following environments: Banking, Publishing, Distribution, Insurance, Government, utilizing IBM Mainframe (DB2, IDMS, IMS, CICS, Systems 36, 38) or DEC/VAX.

We require a college degree and at least 2 years of programming in COBOL or PL/I on an IBM Mainframe.

Our business is our people. Through our Educational Services, our staff participates in an annual curriculum in system development methodologies and database/data communication technologies, including DB2.

Finally, PARTNERS offers an outstanding compensation package that includes Profit Participation, tuition reimbursement, 401K Plan, and an Employee Referral Bonus Program. PARTNERS offers the opportunities, rewards and a quality of life unique in our industry. If you would like to explore these opportunities in complete confidence, please call or write, indicating location of interest:

James P. Saviano
Managing Partner

PARTNERS

COMPUTER PARTNERS INC

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Waltham, MA 02154

(617) 647-0116

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The office of Computer Services at Union College is seeking a Systems Manager for its two HP-3000 computer systems which support administrative computing for the college. Prospective candidates should have a minimum of 2-3 yrs. systems experience with HP 3000 computers. Responsibilities include installation & maintenance of systems and third party software, systems performance, development of procedures, training. College degree or relevant experience. Experience with networking a plus.

Union has a computer-intensive environment including an extensive campus network and a six-VAX cluster for academic computing.

An exciting opportunity for the right person. Excellent benefits, educational opportunities. Graduate programs include Computer Science and MBA.

Please send resume and salary requirements to:

Union College
Personnel Department
Schenectady, NY 12308

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Publishing Systems Programmer Analyst

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This position requires a college degree and minimum of 2 years experience in publishing systems such as ATEX, SII or CCSI. The ideal candidate will also have computer communications experience, excellent written and verbal skills, a knowledge of composition and ATEX experience.

If you strive to work in a dynamic environment that offers job satisfaction, excellent benefits and competitive salary commensurate with experience, then please send resume and salary history to:

The Atlanta Journal THE ATLANTA CONSTITUTION

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EOE

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Salaries 25K to 60K
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IBM Programmer/Analyst

The Atlanta Journal-Constitution uses mainframes in almost every aspect of publishing our newspaper. We need an individual to provide their experience in programming and analysis for our IBM 3090/3081 and Series/1 systems. The orientation of this position is decidedly technical.

The requirements for this position include a college degree, 2-3 years IBM mainframe programming experience, using MVS and Assembler and 1-2 years Series/1 experience using RPS. If you also have had some experience with PL/I, CICS or IDMS and demonstrate excellent communication skills, you may be a candidate for this important position.

If you strive to work in a dynamic environment that offers job satisfaction, excellent benefits and competitive salary commensurate with experience, then please send resume and salary history to:

The Atlanta Journal THE ATLANTA CONSTITUTION

Employment Representative
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We offer a comprehensive benefits package including a 401 (K) profit sharing plan. Qualified applicants please send resume to the following for confidential consideration:

Consultants in Computer Software
101 E 5th St., Suite 1616
St. Paul, MN 55101
Attn: Personnel

COMPUTER SCIENCE: Applications are invited for a tenure-track faculty position beginning September, 1988. Candidates from all areas of computer science or a computer-related field will be considered. PhD preferred and is a college requirement for tenure. A strong commitment to undergraduate teaching at a liberal arts college and excellent communicative skills are mandatory. Computer Science at Albright is an established major field of study based on ACM Curriculum '78 recommendations. Send academic vita to Professor Daniel Falabella, Chair, Computer Science Department, Albright College, Box 15234, Reading, PA 19612-5234. Application deadline is January 15, 1988 or until position is filled. AAEOE. Albright College encourages applications from women and minority candidates.

Senior System Programmer - Determine hardware and software requirements. Verify and develop technical specifications. Install and implement IBM operating system and communication system of DOS/VSE; VM/SP; VM/XA; MVS/XA; TSO/SPF; CICS/VS; ACF/VTAM. Detect, diagnose, correct, and maintain problems in the above system. Perform capacity planning, analyze and tune systems performance. Define and develop system exits and establish system standards. Migrate operating system from DOS/VSE to MVS/XA, VM/XA; CICS/VTAM on IBM 3090 Processor Complex. Must know Assembler and COBOL programming languages. ADABAS/Natural data base manager systems. 35 hours/week, \$43,500/year, 5 years experience, BA degree in Computer Science. Send resume to: Mel-disc, 933 MacArthur Blvd., Mahwah, NJ 07430, Attn: Mr. Donald Lapp.

Electronics/Software Engineer- Design, implement, evaluate, program, troubleshoot and revise analog loop test and measurement equipment for communications company dealing with private industry and the US Army; 4 year Bachelor Degree in Electrical Engineering plus 3 years experience required; \$34,600 annual salary plus benefits to start. Send resume to: H. Block, Job Service 18th South Avenue, Rochester NY 14604.

PROGRAMMER

Kraft/S.S. Pierce, a leader in the Food Service Industry, has an immediate opening for an experienced NCR VRX-Cobol Programmer. A minimum of 2 years experience with NCR Cobol or 3 years with any other vendor's Cobol is required, as well as an Associate's Degree in Computer Service. Additional experience in lieu of degree requirement will be considered.

The successful candidate will be responsible for new system development and maintenance of existing systems. Experience in Distribution Systems is a plus.

We offer a competitive salary and an excellent benefits package. Please send resume with salary requirements to:

Karen A. Uzar
Kraft/S.S. Pierce
One Technology Dr.
PO Box 6030
Peabody, MA 01960



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The future of the Network Support Systems Division of Northern Telecom Inc. can be found in helping telecommunications providers adapt to changing operations environments. NTI's Digital Facility Management Systems (DFMS) offers cost effective, forward-looking solutions

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- Develop commercial specifications into technical requirements working with marketing, customers and development groups

SYSTEMS ENGINEER/MODELING

- Systems software modeling using SLAM

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- Requires experience designing and programming in "C" for VMS or UNIX environment
- RDBMS experience desired

SOFTWARE QUALITY ENGINEER

- Involvement in entire software development cycle from design through beta tests
- Commercial experience required

FIRMWARE ENGINEERS

- Requires design experience using structured methodologies with "C" in a real-time environment
- VRTX, Intel and X.25 packet switching experience desired.

The world's largest supplier of fully digital telecommunications systems has more to offer than a competitive salary and excellent benefits. Experience how much more. Send your resume to: **Manager, Human Resources Administration, Northern Telecom Inc., Dept. BT 192, P.O. Box 649, Concord, NH 03301.** An equal opportunity employer, m/f/h/v. Permanent resident or U.S. citizen required.

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If you are a forward thinking technician who would value this opportunity to influence software development practices at Fortune 1000 companies, Sage Software is the place for you.

These positions require extensive application development experience in any of the following areas:

COBOL	IMS DB/DC
DB2	SQL/DS
CICS	Structured Methodologies
Dialog Manager	VSAM

These positions also require domestic and international travel to client sites and are eligible to participate in the Sage incentive compensation program.

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(301) 230-3200 (800) 638-8703



EEO/MF

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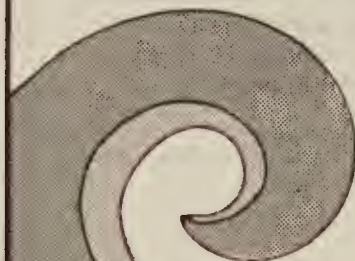
The Massachusetts Water Resources Authority requires the expertise of an MIS professional who has the proven ability to assist in the design and coordination of a standard Systems Development Methodology for nine organizationally independent systems, each with a multitude of applications. If you have the ambition to build this pivotal foundation, consider the following MWRA position.

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As one of the key managers in our MIS function, this seasoned professional will provide guidance, consulting, and training in the application of Systems Development Methodology to Information Systems projects. Working as a team member, applicant will help the MIS staff plan, estimate and schedule project work and be responsible for coordinating the integration of the MIS Department's administrative policies and procedures. Individual will help plan user participation and technical support, foster understanding by all management levels of their roles, review Systems Development Methodology materials with first time users, assist in fine-tuning Systems Development materials and guidelines and monitor Systems Development Methodology usage.

To qualify, applicant must have a minimum of 10 years' experience in Information Systems with 5 years as a project leader working on 4 or more successful projects. Good communication skills and ability to supervise effectively are required. Salary up to low 60's depending on experience.

Interested candidates are invited to send resume to the Personnel Department, Massachusetts Water Resources Authority, Charlestown Navy Yard, 100 First Avenue, Boston, MA 02129.



MASSACHUSETTS WATER RESOURCES AUTHORITY

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YOU CAN MAKE A DIFFERENCE

We are looking for a highly-motivated, results-oriented Programmer Analyst to fill some very large shoes. This person will work closely with management and users on the development of internal and library-based systems. We are a fast-paced, team-oriented shop, dedicated to maintaining our industry edge through new product development and superior planning.

Position requirements include:

- Strong RPG III/II technical skills
- Two years System 38 experience
- Minimum 3 years programmer/analyst experience in an IBM 3X environment
- Project management skills
- Excellent written and verbal communication skills

Yankee Book Peddler, Inc. is a national book wholesaler providing unparalleled service excellence to university libraries nationwide. We offer a salary and benefit package commensurate with experience. Qualified applicants should direct resume and salary requirements to:



Christine Riley
Yankee Book
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Contoocook,
NH 03229

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Select and implement multiuser computer systems. Professional position requires good communications skills and business knowledge. Technical proficiency with COBOL and 4GL data base languages a must. Knowledge of VAX/VMS and IBM PC's a plus. Send resume and salary history to:

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TSSI
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Ossining, NY 10562

COMPUTER PROFESSIONALS

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FLORIDA

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HOGAN	BURROUGHS, MAINFRAME
IDMS, ADISO	ADABAS/NATURAL
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COBOL, OS/MVS	TECH WRITERS

For immediate consideration, call and send resume to:



information management

Personnel/Recruitment
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National Wats 1-800-826-1117
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Citicorp Information Management Services, Inc., has several positions available for individuals who are excited by the prospect of being an integral part of a new and innovative subsidiary of Citicorp.

Senior Systems Analyst

Responsible for optimizing a production environment using systems knowledge and business management tools, as well as developing teams of analysts and programmers. Requirements include a minimum of five years' DEC VAX, including knowledge of C language and extensive VMS experience; DBMS experience a plus.

Programmer

Responsible for developing software interfaces to remote hosts and optimizing existing transaction processing system. Requirements include a minimum of two years' DEC VAX experience, including knowledge of C language and VMS.

Interested individuals, send resume to Meg Mackie.

CITICORP

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EOE



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Send resume, letter or business card in confidence to:

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Unisys Corporation, B-360,
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Unisys is an affirmative action employer

UNISYS

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Battelle, a leader in research and development, has employment opportunities available for experienced Computer Scientists and Engineers in its Pacific Northwest laboratories. Current openings are:

Data Communications/Network Engineer

This position involves the design and support of data communications and computer network facilities in a dynamic, distributed computing environment utilizing state-of-the-art technologies such as digital PABX, intelligent port selectors, microwave and fiber-optic transmission media, local area networks, and high speed metropolitan area networks. Duties include assessment of new technologies and products; design and acquisition of network communications systems; network installation; testing and troubleshooting; and coordination of regional, national, and international wide-area network communications. An advanced degree in electrical engineering or computer science and six years' experience (or equivalent) required. Experience with Ethernet-based LANs and DECnet also required. Experience with microwave and/or fiber-optic communications desirable.

Minicomputer Systems Support

These positions involve technical support of distributed superminicomputer systems and scientific workstations. Duties include systems software development and support, hardware and software acquisition, and user consultation. A degree in computer science and four years' experience with DEC VAX (VMS) or HP 3000 (MPE) minicomputers and FORTRAN, Pascal, or "C" programming language required. Experience with UNIX operating system desirable.

U.S. citizenship required.

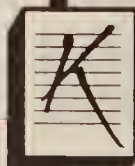
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Battelle

Pacific Northwest Laboratories



KENDA SYSTEMS, INC.

BOSTON
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SOFTWARE CONSULTANTS

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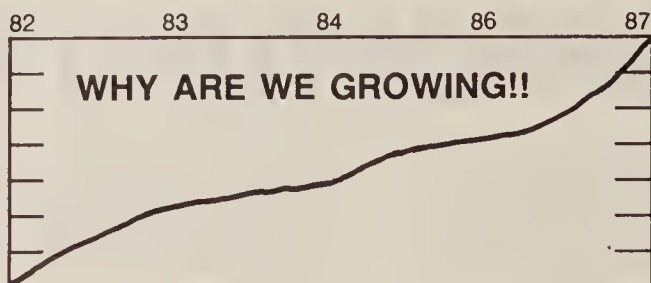
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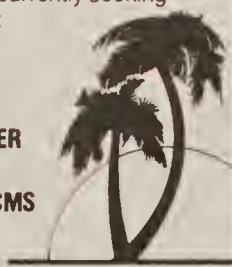
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RFP NO. DATE
2-01-24801-0Nov. 22/87

TIME
2:00 PM
FOR: Engineering Services for Review of Design of New Data Center.

2-01-24798-0Nov. 23/87

3:00 PM
FOR: Project Administration for New Data Center Construction.

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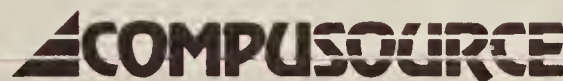
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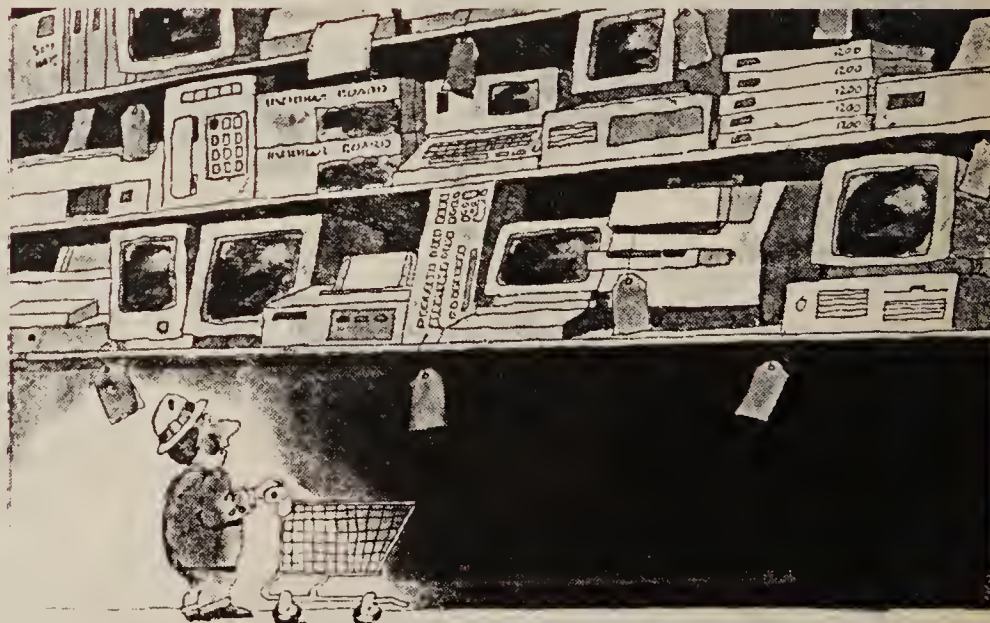
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ADVERTISERS INDEX

Alcatel Business Systems.....	28-29	Jeyco.....	S10
Amdahl DASD.....	83	JYACC.....	S18
Application Development Systems.....	S12	KAO Corp.....	36
Aspen Research.....	14	Litton Computer.....	S8
AT&T.....	16-17,91,102-103,S24-S25	Memorex.....	78-79
Beta Systems Software Inc.....	23	Michaels,Ross & Coie,Ltd.....	45
B.I. Moyle & Associates.....	100	Micro Focus.....	41
BMC Software.....	80,81	Mid-American Control Corp.....	44
Bridge Communications.....	96	Mike Murach & Associates.....	9
Candle Corp.....	98,112	Motorola.....	110-111
Catalyst.....	SC3	MSA.....	144
CGI Systems.....	S14-S15	Multi-Tech Systems.....	59
Concom Systems.....	64/65,70	NCR.....	38-39
Cognos.....	27	NEC.....	108-109
Command Technology Corp.....	S16	Netec.....	57
Communication Networks '88.....	74-75	Nevada Western.....	118
Compaq.....	24-25	Nixdorf.....	88
Computer Tech Group.....	64	North Ridge.....	50
Compuware.....	S7	Northern Telecom.....	68
Control Data Corp.....	14-15	Novell.....	51-53
Cosmos.....	SC4	On-Line Software.....	31,33,35,37,87,117
Cullinet Software.....	5,S4-S5	Oracle.....	11
CW Buy,Sell,Swap.....	65	Pathway Design.....	72
CW Circulation.....	97	PCI.....	18
CW House.....	73	PC's Limited.....	104-105
CW Spotlight.....	S17	Porelon.....	54
CW Testimonial.....	136	Prime Computer.....	48
Data Design.....	19	Racal Milgo.....	61-63
DataEase.....	S11	Realia.....	22
Data General.....	42	Retrix.....	60
Data Group.....	82	SAS Institute.....	40
Data Language.....	S9	Sequola.....	34
Dataserv.....	90	Softouch Systems.....	100
Daware Inc.....	57	Software AG.....	10
DCA.....	46-47	Spur Products Inc.....	118
Decision Data.....	76	Syncsort.....	3
Digital Consulting.....	S20/S21	Systems Center.....	67,69
Diversified Programming Services Inc.....	82	Tandem Computer.....	56
Dow Jones Service.....	15	Tandon.....	66
Dynasoft.....	68	Technology Software Concepts.....	115
EMC.....	119	3 Com.....	114
Fifth Generation Systems.....	95	3M/Telecom Products Division.....	116
Fujitsu.....	101	Tone Software.....	50
Gandalph.....	55	Travtech.....	116
Global Software.....	107	Trax Softworks.....	67-69
Goal Systems.....	S3,26	Tymnet.....	143
Harris Corp.....	86	Unibase Software Inc.....	SC2
Hayes Microcomputing.....	12-13	Unicorn Systems.....	49
Help/380 Systems.....	17	Unisys.....	106
Hewlett Packard.....	88/89	Visual Technology.....	92-93
Honeywell Bull.....	84-85	VM Software.....	7,49
Informix.....	71,S20	VM/CMS Unlimited,Inc.....	30
ISI Systems.....	S13	Whitesmiths,Ltd.....	S19
ITT.....	58	Wyse Technology.....	56/57
JDS Microprocessing.....	94	Xerox.....	44-45

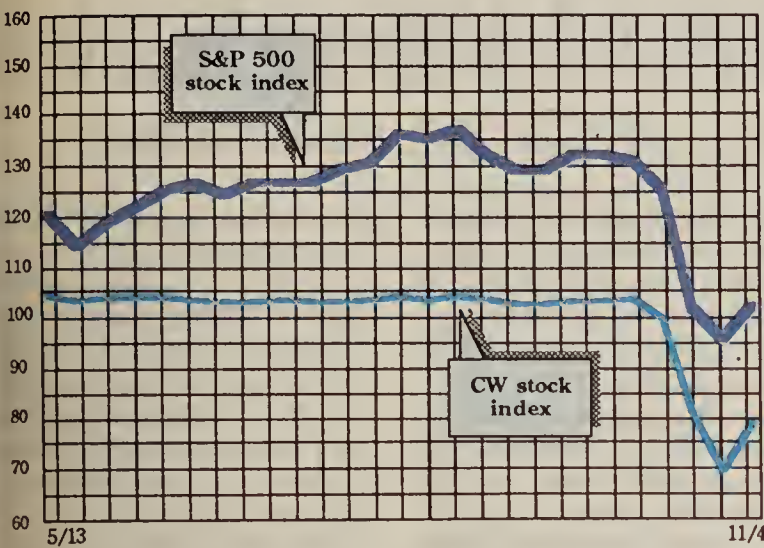
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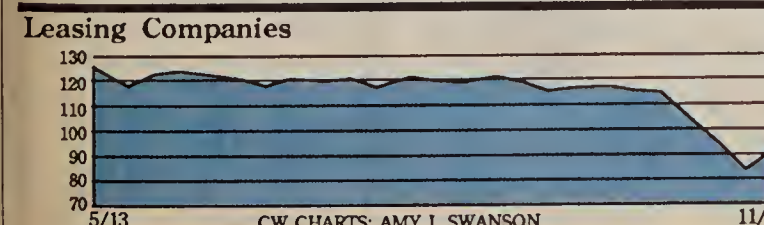
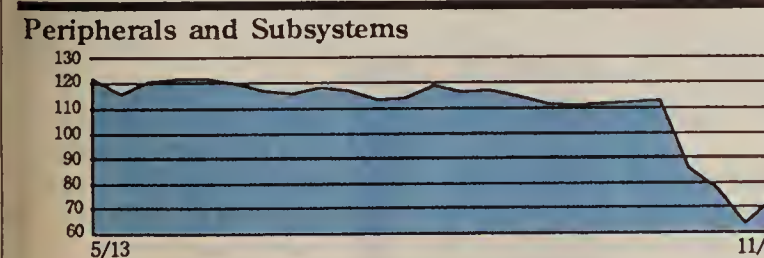
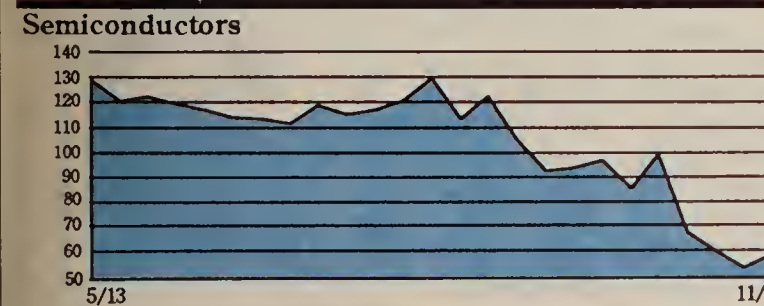
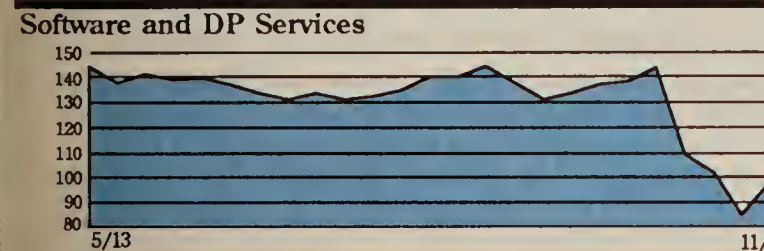
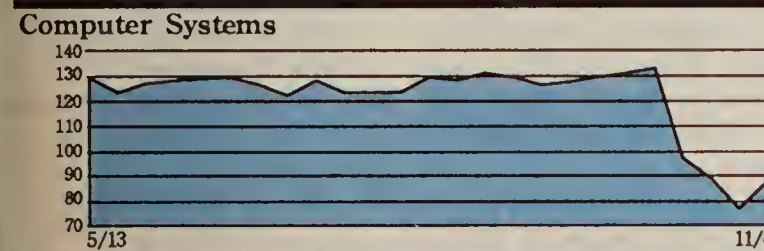
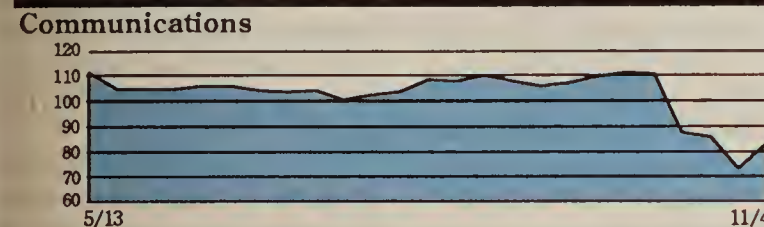
Upcoming Computerworld Spotlight Sections

Issue Date	Topic	Ad Closing Date
Nov. 30	Power Protection Equipment	Nov. 13
Dec. 7	DEC-Compatible Hardware	Nov. 20
Dec. 14	Add-In Boards	Nov. 25
Dec. 21	Spreadsheets Software	Dec. 4
Jan. 11	Terminals and Terminal Emulation Products	Dec. 24
Jan. 25	LANs	Jan. 8
Feb. 8	DEC-Compatible Software	Jan. 21
Feb. 29	Performance Management/Capacity Planning	Feb. 12

STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	72.8	83.4
Computer Systems	76.6	87.7
Software & DP Services	84.1	97.3
Semiconductors	53.7	59.0
Peripherals & Subsystems	64.2	74.1
Leasing Companies	83.8	90.7
Composite Index	69.7	78.8
S&P 500 Index	95.6	102.1



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 4, 1987

EXCH	52-WEEK RANGE (1)	PRICE NOV. 4 1987	WEEK NET CHNG	WEEK PCT CHNG
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Communications and Network Services

N	AMERICAN INFO TECHS CORP	100	74	88.25	1.5	1.73
N	ANDREW CORP	19	11	11.63	0.88	8.14
Q	ARTEL COMM CORP	5	2	1.63	0	0
Q	AT&T	36	20	29.63	1	3.49
Q	AVANT GARDE COMP INC	6	2	2.5	0.38	17.65
Q	AVANTEK INC	19	7	9.38	0.88	10.29
N	AYDIN CORP	38	16	19.75	2.13	12.06
N	BELL ATLANTIC CORP	80	61	72.88	1.88	2.64
N	BELLSOUTH CORP	44	29	39.63	3.88	10.84
N	FIBRONICS INT	28	12	15.75	3.75	31.25
Q	COMPRESSION LABS INC	8	2	3.88	0.13	3.33
Q	COMPUTER NETWORK TECH	6	2	2.56	0.19	7.92
Q	CONTEL CORP	40	25	28.5	1	3.64
Q	DATA SWITCH CORP	9	4	4.75	1	26.67
Q	DIGITAL COMM ASSOC	49	20	23	3	15
Q	DYNATECH CORP	44	14	20	5.5	37.93
Q	EQUATORIAL COMM CO	5	2	3.06	0.31	11.38
Q	GANOALF TECHNOLOGIES	11	5	5.5	0.13	2.33
Q	GENERAL OATACOM INDS	14	3	4.63	0.88	23.33
N	GTE CORP	45	29	37	1.75	4.96
N	INFOTRON SYS CORP	12	5	5.5	0.5	10
N	ITT CORP	66	45	50.38	0.75	1.51
N	MA COM INC	16	7	10.13	2.25	28.57
Q	MCI COMMUNICATIONS CORP	12	5	9.38	1.13	13.64
Q	MICOM SYS INC	18	7	7.88	0.38	5
N	NETWORK SYS CORP	19	7	8.38	0.75	9.84
N	NORTHERN TELECOM LTD	24	14	17.5	2.13	13.82
N	NOVELL INC	30	12	18.5	6.5	54.17
N	NYNEX CORP	78	58	71.13	3.5	5.18
N	PACIFIC TELESIS GROUP	34	9	29.5	1	3.51
N	PARADYNE CORP	9	4	4.25	0.13	3.03
A	PENRIL CORP	6	1	2	0.63	45.45
N	PLESSEY PLC	41	24	24.25	0	0
N	SCIENTIFIC ATLANTA INC	20	8	11.5	2.75	31.43
N	SOUTHWESTERN BELL CORP	46	22	38.13	1.13	3.04
Q	3 COM CORP	26	12	17.5	4	29.63
N	TIMEPLEX INC	41	17	25.63	7.63	42.36
N	UNGERMANN BASS INC	16	6	7.75	1.88	31.91
N	U S WEST INC	60	43	51.38	2.13	4.31

Computer Systems

Q	ALLIANT COMPUTER SYS	37	5	6.75	0.5	8
Q	ALPHA MICROSYSTEMS	6	3	3.63	0.63	20.83
Q	ALTOS COMPUTER SYS	17	9	11.63	2	20.78
A	AMDAHL CORP	50	19	29	5.88	25.41
Q	APOLLO COMPUTER INC	25	9	10.63	1.25	13.33
Q	APPLE COMPUTER INC	60	17	36	4	12.5
N	BOLT BERANEK & NEWMAN	30	12	14.5	0.5	3.57
N	BRITTON LEE INC	5	2	1.88	-0.13	-6.25
N	COMPAQ COMPUTER CORP	79	15	51.75	8.25	18.97
Q	COMPUTER AUTOMATION INC	17	3	7	0.5	7.69
A	COMPUTER CONSOLES INC	12	2	3.5	0.63	21.74
N	CONCURRENT COMP CORP	24	11	14.25	2.5	21.28
N	CONTROL DATA CORP OEL	38	18	24.25	3.25	15.48
Q	CONVERGENT TECH	12	3	3.81	0.56	17.32
Q	CONVEX COMPUTER CORP	22	6	8	0.5	6.67
Q	CRAY RESH INC	136	47	71	8	12.7
N	DAISY SYS CORP	13	5	6.38	1.13	21.43
N	DATA GEN CORP	39	16	21.63	1.88	9.49
N	DATAPoint CORP	9	3	4.88	1	25.81
N	DIGITAL EQUIP CORP	200	97	131.88	6.38	5.08
N	FLOATING POINT SYS INC	17	4	4	0	0
N	GOULO INC	34	8	13.38	1.25	10.31
N	HARRIS CORP	43	24	26.88	2	8.04
N	HEWLETT PACKARD CO	74	36	48	3	6.67
N	HONEYWELL INC	91	49	59.13	9.13	18.25
N	IBM	176	102	120.63	2.63	2.22
Q	INFORMATION INTL INC	17	10	10	0	0
Q	IPL SYS INC	3	2	2.13	0.13	6.25
Q	MASS COMPUTER CORP	14	6	8	1	14.29
N	MATSUSHITA ELEC INDL LTD	196	93	146.5	16.88	13.02
Q	MEGADATA CORP	7	2	3.25	0	0
N	MENTOR GRAPHICS CORP	39	14	16.88	3	21.62
N	NBI INC	14	4	5.25	0.75	16.67
N	NCR CORP	87	44	62	7.5	13.76
N	PRIME COMPUTER INC	31	12	16.25	2.88	21.5
N	PYRAMID TECHNOLOGY	12	4	7.25	1.25	20.83
Q	STRATUS COMPUTER	41	15	22	4.75	27.54
Q	SUN MICROSYSTEM INC	46	14	33.63	9.63	40.1
Q	SYMBOLICS INC	6	1	2	0.5	33.33
N	TANDEM COMPUTERS INC	38	17	23.88	2.38	11.05
N	TANDY CORP	57	31	40	6	17.65
N	ULTIMATE CORP	37	16	22.75	5.5	31.88
N	UNISYS CORP	48	24	31.13	2.13	7.33
A	WANG LABS INC	19	10	11.88	1	9.2

Software & DP Services

Q	ADVANCEO COMP TECH	6	3	3.88	-0.25	-6.06
N	ADVANCEO SYS INC	35	14	26.75	3.75	16.3
N	AGS COMPUTERS INC	30	11	15.63	4.63	42.05
N	AMERICAN MGMT SYS INC	20	9	12.5	2.88	29.87
N	AMERICAN SOFTWARE INC	22	6	8.38	2.25	36.73
Q	ANACOMP INC	11	3	5.25	0.75	16.67
Q	ANALYSTS INTL CORP	10	4	6.25	1.88	42.86
Q	ASHTON TATE	33	13	17.75	2.25	14.52
Q	ASK COMPUTER SYS INC	17	6	8.75	1.63	22.81
Q	AUTOODESK INC	34	12	18	5	38.46
N	AUTO DATA PROCESSING	55	16	40.88	1.75	4.47
N	BOOLE & BABBAGE INC	12	5	6.38	1.63	34.21
N	COMPUTER ASSOC INTL INC	37	13	25.5	2.63	11.48
N	COMPUTER HORIZONS CORP	15	8	9.5	0.63	7.04
N	COMPUTER SCIENCES CORP	73	37	47.75	4.75	11.05
N	COMPUTER TASK GROUP INC	18	10	10.5	0.75	7.69
Q	COMSHARE INC	28	11	13	0.5	4
N	CULLINET SOFTWARE INC	14	5	6.75	1	17.39
Q	CYCARE SYS INC	10	6	6.13	-0.25	-3.92
Q	DUQUESNE SYS INC	33	10	15	2.25	17.65
Q	ENDATA INC	16	6	0	-9.5	-100
N	GENERAL MTRS (CLS E)	51	24	36.25	5.25	16.94
Q	HOGAN SYS INC	17	5	6.5	0.88	15.56
Q	INFORMIX CORP	31	9	19	4	26.67
Q	INTELLICORP INC	11	3	1.4	0.5	14.29
Q	KEANE INC	10	5	6.25	0	0
Q	LOTUS DEV CORP	40	16	25.5	6	30.77
Q	MANAGEMENT SCI AMER	21	8	8.5	0.5	6.25
Q	MICRO PRO INTL CORP	8	2	4.31	0.63	16.95
Q	MICROSOFT CORP	79	20	48.75	9.25	23.42
Q	NATIONAL OATA CORP	34	19	22.25	1.5	7.23
Q	ON LINE SOFTWARE INTL INC	22	8	10.75	0	0
Q	ORACLE SYS CORP	38	9	23.75	7	41.79
N	PANSOPHIC SYS INC	28	11	13.25	2.25	20.45
Q	POLICY MGMT SYS CORP	30	15	20.5	5	32.26
Q	PROGRAMMING & SYS INC	14	8	8.25	0.75	10
Q	REYNOLDS & REYNOLDS CO	39	15	20.5	5.5	36.67
Q	SEI CORP	18	9	13.5	1.75	14.89
Q	SHAREO MED SYS CORP	53	19	20.63	0.63	3.13
Q	SOFTWARE AG SYSTEMS INC	19	9	9.5	0	0
Q	SOFTWARE PUBG CORP	17	5	7	1.5	27.27
A	STERLING SOFTWARE INC	16	6	7.25	0.75	11.54
Q	SUNGARD DATA SYS INC	21	10	13	3	30
Q	SYSTEMATICS INC	30	17	21.75	2.75	14.47
N	SYS. SOFT INC.	24	7	10	2.75	37.93
N	URS CORP	23	11	12.25	1.63	15.29

Q	VM SOFTWARE INC	45	9	9.75	1.25	14.71
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Semiconductors

N	ADV MICRO DEVICES INC	25	10	10.88	-0.13	-1.14
N	ANALOG DEVICES INC	24	10	10.63	0.13	1.19
Q	ANALOGIC CORP	13	6	8	1.5	23.08
Q	INTEL CORP	42	13	26.25	-5.5	-17.32
Q	LSI LOGIC CORP	17	7	8.38	1.38	19.64
N	MOTOROLA INC	74	35	44.5	3.5	8.54
N	NATL SEMICONDUCTOR	22	10	13	1.75	15.56
N	TEXAS INSTRS INC	80	36	49.75	7.25	17.06
A	WESTERN DIGITAL CORP	33	12	15.75	2.25	16.67

Peripherals

Q	ALLOY COMP.	12.75	4.5	5.75	0.5	9.52
N	AM INTL INC	9	3	4.75	1.25	35.71
Q	AST RESH INC	23	6	8.88	2.25	33.96
Q	AUTO TROL TECH CORP	9	3	3.25	0.25	8.33
Q	BANCTEC INC	16	6	6.88	0.38	5.77
Q	CIPHER DATA PRODS INC	18	4	6.75	2	42.11
A	COGNITRONICS CORP	5	2	2.38	-0.25	-9.52
N	COMPUGRAPHIC CORP	28	19	22.38	0	0
N	COMPUTERVISION CORP	23	8	8.13	-0.38	-4.41
A	DATAPRODUCTS CORP	24	7	8.75	1.75	25
A	DATARAM CORP	9	6	6.44	-0.06	-0.95
N	DECISION INOS CORP	13	4	6.5	1	18.18
N	EASTMAN KODAK CO	71	41	50.63	-2.25	-4.26
Q	E M C CORP MASS	29	10	15.25	2.25	17.31
Q	EMULEX CORP	10	4	4.75	0.63	15.15
Q	EVANS & SUTHERLAND	40	18	21	2.38	12.75
Q	ICOT CORP	13	3	4.25	0	0
Q	INTERLEAF INC	24	9	15.13	3.13	26.04
Q	IOMEGA CORP	8	1	1.88	0.25	15.38
Q	LEE DATA CORP	10	3	3.13	-0.25	-7.41
Q	MASSTOR SYS CORP	6	1	1.94	0.31	19.26
Q	MAXTOR CORP	34	6	7.5	0.75	11.11
Q	MICROPOLIS CORP	44	13	20.25	5.25	35
Q	MINISCRIBE CORP	18	5	8.25	2.25	37.5
N	MINNESOTA MNG & MFG CO	84	45	60.13	4.13	7.37
A	MSI DATA CORP	24	11	14	2	16.67
Q	PRIAM CORP	6	1	1.75	0.5	40
Q	PRINTRONIX INC	13	8	8.5	0.5	6.25
N	QMS INC	27	12	13.75	1.25	10
Q	QUANTUM CORP	35	8	9	-0.25	-2.7
Q	RAMTEK CORP	6	2	2.38	0.25	11.76
N	RECOGNITION EQUIP INC	27	7	8.88	2.13	31.48
Q	REXON INC	14	5	5.5	0.13	2.33
Q	SCAN TRON CORP	17	7	10	1.75	21.21
Q	SEAGATE TECHNOLOGY	46	10	12.25	2.13	20.95
N	STORAGE TECH CORP	5	1	1.75	0.5	40
Q	TANOON CORP	7	2	2.38	0.56	31
A	TEC INC	7	3	3.88	0.25	6.9
N	TEKTRONIX INC	43	25	31.25	5.25	20.19
Q	TELEVIDEO SYS INC	3	1	1.69	0.19	12.53
N	TELEX CORP	102	30	53.5	10.25	23.7
Q	WYSE TECH	40	11	21	2.13	11.26
N	XEROX CORP	85	50	56.5	6.38	12.72
O	XIDEX CORP	16	6	7.38	0.5	7.27

COMDEX/FALL '87

Show wrap-up

Display of wares



WAYNE C. KODEY

A Comdex attendee examines Compaq's show-floor exhibit of workstations.

Novell ramping up Netware extensions

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — Novell, Inc. last week announced plans to provide extensions of its Netware network operating system that offer users capabilities similar to those provided by IBM's OS/2 Extended Edition. The announcement is part of a Novell plan to position Netware as an alternative to OS/2 Extended Edition on a network server.

Softcraft, Inc., a Novell subsidiary, is also said to be working on a data base engine similar to the one IBM plans to build into OS/2 Extended Edition.

The Netware extensions will include fault tolerance and network management capabilities that are not currently available under either the Server Message Block protocol or OS/2, according to Craig Burton, Novell's senior vice-president of corporate planning and development. Those extensions are expected to ship shortly after the first customer deliveries of OS/2 Extended Edition 1.0 in July 1988.

Speaking separately at an IBM press conference last Tuesday at Comdex/Fall '87 here, Novell President Raymond Noorda reiterated Novell's intent to provide Netware compatibility with OS/2 Standard Edition running on personal computers that are attached to the network in the first quarter of 1988.

Noorda said that Novell also plans to provide support for OS/2 on the server at a later date.

The Netware Support Package for OS/2 will be available for users of Netware Version 2.1 and will not require an operating system upgrade, Novell said.

Noorda also said IBM has provided Novell with technical and programming assistance along with documentation for development of Netware compatibility for OS/2.

OS/2 for Btrieve

Also announcing plans to support OS/2 was Softcraft, Inc., developer of Btrieve, a set of programming subroutines that developers can build into applications to handle data access and record management.

A prototype running on OS/2 was demonstrated in Novell's booth at Comdex. Btrieve for OS/2 reportedly will ship in December and cost \$595.

By writing to Btrieve rather than to the operating system, developers can create files as large as the operating system supports, Softcraft claimed.

Btrieve for OS/2 will provide shared data access in a multi-tasking environment between protected-mode tasks and native-mode tasks, allowing data access across OS/2 and Microsoft Corp. MS-DOS-based applications, Novell said, enabling Btrieve applications to be more easily converted to OS/2.

In addition, Novell announced Btrieve integration with Netware, which is slated to ship with SFT Netware Version 2.1 in the fourth quarter and with both Advanced Netware 2.2 and ELS Netware Level II in the first quarter of 1988.

PS/2 bus clones holding back

Makers want to gauge response, clear legal issues before committing

BY JULIE PITTA
CW STAFF

Clone makers are playing a wait-and-see game with IBM's Micro Channel architecture, saying they will gauge customer interest before committing to cloning IBM's proprietary bus.

For its part, IBM is giving few hints on how, or if, it will allow the Micro Channel to be cloned. The company has issued a "no comment" regarding Micro Channel licensing and has stated the issuance and cost of utility patents are considered on a case-by-case basis. Clone makers surveyed at Comdex/Fall '87 in Las Vegas said they have not commenced discussions with IBM regarding utility licenses. Wyse Technology said queries to IBM regarding the Personal System/2 have so far gone unanswered.

"No one really seems to be clear on the legal issues," said Michael Richman, Wyse sales vice-president. "We'll wait to do anything. If we were the first in the market with a Micro Channel machine, we'd probably get sued."

Richman said IBM's efforts to keep the Micro Channel propri-

etary will hurt its hopes to make the bus a standard. "The only way Micro Channel will become a standard is if there are multiple sources," he said. "OS/2 will not run any faster on a Micro Channel bus than any other architecture. But I admire IBM's efforts in persuading people that the two are tied together."

Compaq Computer Corp., IBM's leading competitor in the personal computer world, has launched a Micro Channel development program, a reversal of its earlier position regarding the new bus. However, Michael Swavely, Compaq marketing vice-president, said the project is not a priority.

Swavely, who declined to provide specific details about the project, said Compaq is not convinced customers will demand the Micro Channel. Compaq's Micro Channel program is a standby strategy, he said.

Other PC manufacturers appear to be following Compaq's lead, taking a cautious stand on the Micro Channel.

"The real issue is: Do people need it?" said John Frank, president of Zenith Data Systems. "Will it displace the [IBM Personal Computer] AT standard?

Will it create dual standards? We don't know that yet."

Frank hinted that Zenith is also investigating a Micro Channel clone, despite his belief that it does not represent a breakthrough in PC technology. However, he expects the AT-bus and the Micro Channel will coexist "for some time."

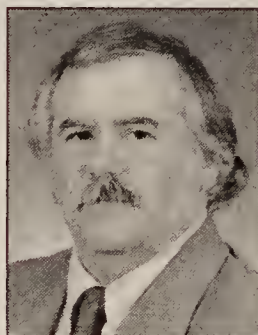
Ed Juge, director of product development for Tandy Corp., which is also pursuing Micro Channel, said Tandy will wait for others to launch a Micro Channel-based micro. Juge said he believes the Micro Channel will become more important to corporate users wishing to hook up PS/2s to IBM mainframes.

"There are some corporate buyers that will buy anything that's IBM," he said. "From that standpoint, not having the Micro Channel would lock us out of a market we're interested in and that we're starting to gain ground in."

Like Frank, Juge said he believes the AT bus will have a long life based on its large installed base and its capability of meeting user requirements, despite the introduction of the PS/2. "The idea of bigger being better is a fallacy," he explained.

OS/2 intro doesn't stop clock

Computerworld polled some of the industry's leading figures at Comdex/Fall '87 last week for their reactions to IBM's announcement that it will ship OS/2 next month. Their comments follow.



"While OS/2 is the foundation of the future, the real benefit to the user will be seen when applications are written specifically for OS/2."

JERRY SCHNEIDER,
PRESIDENT, CAPITAL
PC USER GROUP, INC.

"End users will switch to a new operating system like OS/2 when and if they see applications that run better on the new system. IBM's announcement brings things more into focus, but it's not an event, it's part of an ongoing process."

BILL GATES, CHAIRMAN, MICROSOFT CORP.

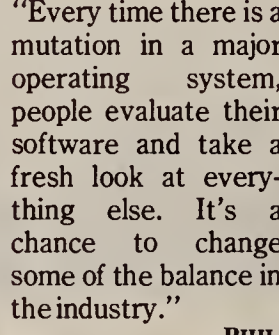
"It's important that IBM gave the specific shipment dates — it shows the skeptics out there that OS/2 is real."

ED ESBER, CHAIRMAN, ASHTON-TATE CORP.

"I'm not sure why IBM is rushing to put out OS/2 when you have companies like Microsoft saying that they're not going to write ap-

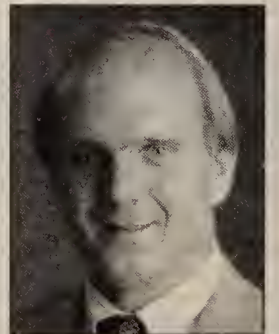
plications until Presentation Manager comes out. I'm wondering what people are going to be able to do with this version of OS/2."

W. E. "PETE" PETERSON, EXECUTIVE VICE-PRESIDENT, WORDPERFECT CORP.



"Every time there is a mutation in a major operating system, people evaluate their software and take a fresh look at everything else. It's a chance to change some of the balance in the industry."

PHILIPPE KAHN, PRESIDENT,
BORLAND INTERNATIONAL



"We've moved out of a phase of ambiguity to a phase of implementation. The design point for the next generation of applications has become very clear... people aren't groping in the dark anymore."

STEVE BALLMER, VICE-PRESIDENT
OF SYSTEMS SOFTWARE,
MICROSOFT CORP.

OS/2 picks up LAN Manager traits

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — IBM last week announced an internally developed network server that incorporates significant portions of Microsoft Corp.'s OS/2 LAN Manager: the redirector, server code and undefined software.

The announcement at Comdex/Fall '87 ended four months of intense speculation over whether IBM would support the LAN Manager. But the LAN Manager and IBM's OS/2 LAN Server are far from being clones. And since IBM stopped short of endorsing the LAN Manager, users and developers may have to choose between the two servers.

"IBM is not supporting the LAN Manager," said Michael

O'Dell, an IBM product manager for LAN System Products.

There are several differences between the two products. For example, the LAN Manager supports OS/2 Standard Edition, which is set to ship next month, whereas the LAN Server requires IBM's OS/2 Extended Edition Version 1.1. The LAN Manager is scheduled to ship in the first half of 1988, and both IBM products are slated for delivery in November 1988.

Also at issue are some LAN Manager Application Programming Interfaces (API) that reportedly will not be supported by IBM before 1989 and possibly not at all.

The impact on users will depend on which way network software and applications develop-

ers go. Since IBM's response to the LAN Manager was similar to its response to Microsoft's MS-Net, users have some clues.

At the time of MS-Net's debut, IBM opted to license just the MS-Net redirector, to which it added other software to create the IBM PC LAN Program. Network software vendor Novell, Inc. chose not to license MS-Net, while rival 3Com Corp. did.

But because IBM, 3Com and Novell all were supporting IBM's Netbios protocols, software written to Netbios would run on all three networks.

Will applications run?

At issue now is whether applications written to the LAN Manager will also run on the OS/2 LAN Server and Novell's proprietary

OS/2 server. Rob Glaser, Microsoft's director of network marketing, said IBM's server uses Microsoft's platform for distributed applications. "At the core, it is consistent with our strategy," he said. "IBM has not explained all the details of the LAN Server."

Novell holds a different view. "If I were a developer, I would ignore those [LAN Manager] APIs and write to IBM," said Craig Burton, Novell's senior vice-president of corporate planning and development.

The OS/2 LAN Server and the LAN Manager share the same redirector and OS/2 APIs, so applications written to the shared APIs will run on both products, IBM's O'Dell said. But because IBM is not licensing LAN Manager-specific APIs, the LAN Server will not support applications written to the non-

shared APIs, he added.

The IBM OS/2 LAN Server Version 1.0 will support interconnected IBM OS/2 Extended Edition Version 1.1 and IBM PC-DOS-based workstations on IBM Token-Ring and PC Networks.

It will also take advantage of the OS/2 mode, multitasking and large memory support, while providing administration facilities to centrally define and control local-area network (LAN) resources.

Version 1.0 has a one-time license charge of \$995. Initial customer shipments are slated to begin in November 1988.

July 1988 is the target release date for the IBM PC LAN Program Version 1.3, which supports the LAN Server. The one-time license charge is \$225. A \$90 upgrade is available for Version 1.2 users.

IBM tool lacking

BY DOUGLAS BARNEY
CW STAFF

While the Database Manager component of IBM's OS/2 Extended Edition operating system will serve a critical role in many IBM shops, it currently lacks key features in the areas of report writing, language support, host data access and applications generation, according to sources familiar with the product.

While IBM has eight months to finish the product, many of the missing features are considered difficult to implement.

Despite these present weaknesses, a \$795 price and an array of third-party tools may make the Database Manager the standard SQL data base engine for microcomputers and significantly boost the SQL standard, according to observers.

The Database Manager's latest incarnation contains a report writer that is list-oriented and cannot do sophisticated functions such as invoicing and creating complex documents, said Richard Finkelstein, a vice-president at the Codd and Date Consulting Group who has been briefed by IBM on the product.

According to Finkelstein, the applications, or forms, generator will not use SQL commands. As a result, a user cannot access a data base during the development of an application but only after the application is running.

In addition, the Database Manager is not expected to offer full SQL capabilities. Finkelstein said a key feature currently missing is an outer join, a basic relational operator.

IBM has paid attention, how-

ever, to critical security details such as commit and rollback, record locking and automatic deadlock detection. The product also features password security.

Some of the Database Manager's limitations will be corrected through future enhancements. The initial release will support the C language, but IBM will offer Pascal and Cobol support only as a future enhancement.

The product will also initially lack the ability to access host data effectively. But a later version will include IBM's Remote Data Services, allowing users to access data more easily on a variety of host computers.

The Database Manager will put pressure on IBM's competitors to cut prices. "That is very aggressive pricing" on OS/2 Extended Edition, said Gene Shklar, director of product marketing for Oracle Corp.'s personal computer software line. Oracle will both compete with the Database Manager and complement it with tools, he said.

Other developers said they see an opportunity to add missing features. "Where they provide the engine, we will simply put out tools to work with their engine," said Laura King, vice-president of marketing at Informix Software, Inc.

S. Bing Yao, founder of SQL vendor Software Systems Technology, Inc., said he believes the Database Manager will lack a powerful forms system, include a less than adequate applications generator and use an outmoded report writer. "We feel that IBM is having an aggressive ship date but with a fairly conservative system," Yao said.

OS/2

FROM PAGE 1

of IBM's Personal System/2 line and the OS/2 operating system. OS/2 has garnered wide support from software vendors, with 65 companies already pledging to ship 125 different OS/2 applications, said William Lowe, president of IBM's Entry Systems Division in an announcement at Comdex/Fall '87 here last week.

Another key component in IBM's strategy, Systems Application Architecture (SAA), is also on the way. IBM announced plans here to ship its Common User Access interface specifications, which will allow vendors to develop SAA-compatible applications.

Although OS/2 development has lagged far behind microcomputer hardware advances and is considered annoyingly late by many, IBM may ship its products before the announced times.

The accelerated release of OS/2 Extended Edition should also speed the release of crucial applications, such as data base development tools and communications software, which may ultimately make the operating system a commercial success.

OS/2 Extended Edition is viewed by many as IBM's attempt to build a proprietary shell around an otherwise open operating system. While third parties can write applications to work with OS/2 Extended Edition, only IBM will sell the product. Also, it is widely believed that OS/2 Extended Edition will only run effectively on IBM hardware, shutting clone makers out.

"IBM intends that our Extended Edition will work better with our hardware and the Micro Channel than any other soft-



M*A*S*H actors Bill Christopher (left) and Jamie Farr (right) join IBM's Bill Lowe at Comdex to give away IBM's millionth PS/2.

ware/hardware combination in the industry," Lowe said.

Generally cautious users said they are anxious to evaluate OS/2 and OS/2 Extended Edition in order to develop implementation strategies. For Alan P. Alesius, a systems consultant with Sun Co., how well OS/2 stands up to scrutiny will determine whether his firm implements a corporatewide upgrade to the latest version of Microsoft Corp.'s MS-DOS or leaps into OS/2. "The sooner we get it, the better," Alesius said.

One user was downright hostile toward OS/2 Extended Edition. "We are very cautious about OS/2, especially Extended Edition. We see it as a means by which IBM will bind us to IBM, and we don't want to be bound to anybody," said Sam Craig, an applied technology analyst for Monsanto Co. "Extended Edition is a real strong attempt by IBM to sink the hook."

But one user praised the OS/2 Extended Edition's ability to emulate the terminals of a variety of

vendors. IBM has "recognized that it will not necessarily be their box at the other end of the network. They have to offer a lot of options to be a useful tool," said Tony Schaller, manager of systems development for Carnegie-Mellon University.

IBM also announced the delivery next month of its 3270 Workstation Program Version 1.1., which allows users to perform multiple IBM PC-DOS applications as well host sessions.

IBM also said it had shipped the first 500 units of its 20-MHz Intel Corp. 80386-based PS/2 Model 80 to dealers. The system is expected to compete directly against Compaq Computer Corp.'s recently announced Deskpro 386/20 series, which contains that company's industry-standard Flex architecture.

To further encourage sales of its 80386-based system, IBM also announced last week it is offering \$1,000 off the price of the PS/2 Model 80 to users who purchase its recently announced desktop publishing software.

Lotus sets up Agenda as personal data base

BY ED SCANNELL
CW STAFF

LAS VEGAS — Lotus Development Corp. last week introduced Agenda, a \$395 free-form data base that allows users to integrate and manage personal information from a variety of different sources.

The program, developed by Lotus founder Mitch Kapor, former principal technologist S. Jerrold Kaplan and Lotus Corporate Vice-President of Research and Development Ed Belove, allows users to enter data "on the fly" and to organize and structure it only as they need to.

"It allows people to organize real-world information, the ideas that you write on scraps of paper," Kapor said. "It mirrors the way people really work and think."

Phrasemaker

As Kapor explained, users can enter their data in Agenda in free-form text units, called "items," without having to set

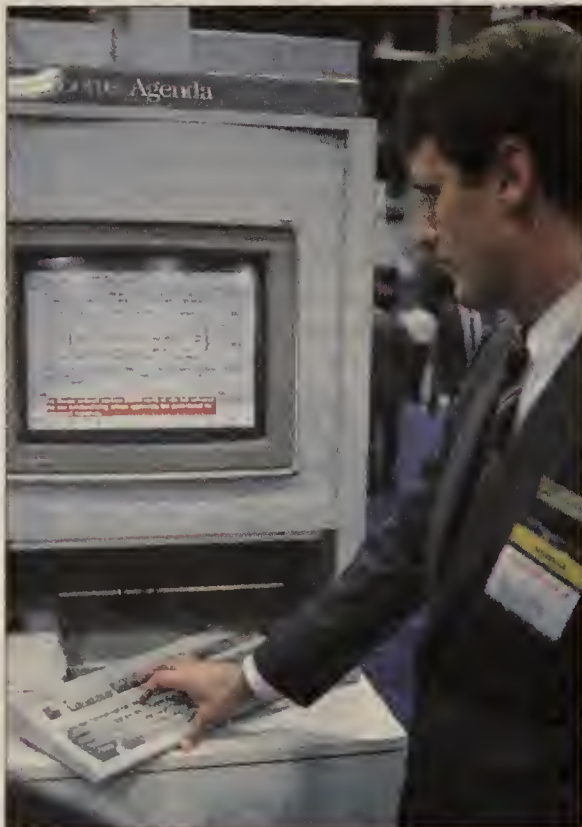
up a data structure.

An item can range in length from a phrase to about 350 words. It can also have a 10-page note attached to it.

Items can also be assigned to categories. Initially, the categories must be assigned manually. But as a user adds structure to the information, Agenda will automatically assign them.

Categories can be referred to by any number of synonyms, and each "parent" category can have subcategories, called "children."

Users can slice the data, called a "view," through the information in the data base. While the view is essentially an ad hoc query, the perspective it lends to the data is dynamic, meaning that any item, category or category assignment can be edited from within any view.



'Free and easy' in Las Vegas

Agenda will automatically update the lines between the item and its categories in all views.

Agenda uses various artificial intelligence techniques to help users organize and customize the way in which the program accomplishes this.

As the data base evolves, Agenda searches each new item for matches and prompts the user with possible category assignments.

Two uses

According to Kapor, there are two ways corporate users can use Agenda: to manage personal information or to import external data from services such as the Dow Jones News/Retrieval service, in-house electronic mail and corporate data residing on mainframes.

Kapor admits that it may be difficult to communicate the advantages of the program to many users, but he is confident they will better under-

stand its value once they see a demonstration.

To hasten that process, Lotus has hired "an army" of people that will be giving thousands of product demonstrations to customers in the next several months.

Getting with the program

"Agenda's agenda is first to establish it as a category, create awareness, build enthusiasm and then build sales," Kapor said. "It'll be a lengthy process," he added.

The program, written in both C language and assembler, will be available in versions for Microsoft Corp. MS-DOS 2.0 and higher and a protected-mode version for IBM's and Microsoft's OS/2.

The product will not be shipped until early spring, according to Kapor.

Several observers attending last week's show here said they thought that Agenda's \$395 price tag might slow its acceptance. Lotus, however, does not seem to think so.

"The price tag sends a message that this is a serious piece of software," Kaplan said.

Desqview update offers simultaneous program use

BY ED SCANNELL
CW STAFF

LAS VEGAS — Quarterdeck Office Systems, Inc. introduced a version of its Desqview operating environment that allows 32-bit protected-mode programs to run simultaneously with DOS-compatible programs on Intel Corp. 80386-based systems. Previously, protected-mode programs could only work concurrently with each other.

Priced at \$190 and scheduled to be available in the first quarter, Desqview/386 reportedly will be able to run 32-bit programs on the 80386 because it

works with a 386-version of Phar Lap, Inc.'s DOS-Extender. Quarterdeck demonstrated Desqview/386 running Ansa Software Co.'s Paradox 386 data base along with other popular DOS-compatible programs at Comdex/Fall '87.

Paradox 386 is the first to use DOS-Extender. Quarterdeck President Therese Myers said she expects to see many more mainstream software programs released early next year that incorporate the product.

Through a joint development agreement with Phar Lap, Quarterdeck has built into Desqview/386 the support necessary

to run multiple 386/DOS-Extender programs simultaneously with DOS programs, Myers said.

Two Desqviews

Desqview/386 is an enhanced version of Desqview 2.0, Quarterdeck's operating environment for Intel 8086-, 8088- and 80286-based systems, which the company said it still plans to make available.

Added to Desqview's ability to run text and IBM Color Graphics Adapter graphics in windows is Desqview/386's ability to do the same with IBM Enhanced Graphics Adapter graphics through a technique called virtualization.

Quarterdeck also announced it is shipping Desqview 2.01 with support for the Lotus/Intel/Microsoft Expanded Memory Specification 4.0.

Small firms skipping PS/2

BY ALAN J. RYAN
CW STAFF

LAS VEGAS — IBM's Personal System/2s may be part of corporate America's purchase plans, but the pricey models are not making significant inroads into mid-size and small companies, according to informal interviews conducted at Comdex/Fall '87 here last week.

"We'll stay with the old stuff," said Bernd Wuschansky, technical manager at Datamega in Munich, West Germany. He said he can configure an IBM Personal Computer AT-compatible machine with a color monitor, a Video Graphics Array card, a 40M-byte Fujitsu Ltd. hard disk drive and 1M byte of random-access memory for approximately \$2,500. IBM's Intel Corp. 80286-based PS/2 Model 50, which features the Micro Channel architecture, lists for \$3,595 without a monitor.

Dealer Thomas Hudson, owner of a Computerland Corp. store in Redding, Calif., said customers have not been knocking down his doors to buy PS/2s. "We have a lot of customers who still want non-PS/2 types of products. There's a lot of interest in PS/2 but also some hesitancy," he said. "People are still interested in AT-type clones. We'd still be selling ATs if IBM made them."

What is not helping IBM's position, users said, is the fact that there is no special connection between the PS/2 and IBM's OS/2. The Microsoft Corp. version, MS OS/2, will work on non-IBM and non-Micro Channel Intel 80286- and 80386-based machines.

Waiting for nothing

User Dick Dickstein, chairman of the Las Vegas PC Users Group's software review committee, said he and five others in the group waited until IBM came out with the PS/2 line before buying microcomputers. "Out of the six people, only one bought a PS/2," he said.

Users at the show said that with the availability of the operating system in sight, they want applications. In response to a question from a Wordperfect Corp. representative, audience members at one Comdex session said Wordperfect should devote about half of its resources to developing OS/2 applications, according to Jerry Schneider, president of the Capital PC Users Group and chairman of the session.

For others, however, OS/2 is on the back burner. Datamega's Wuschansky said, "With everything we have running under MS-DOS, it would be a waste of money to change it now. OS/2 would cost me a fortune."

Tandy plugs Xenix 386 into micro

LAS VEGAS — Tandy Corp. said last week it will offer Santa Cruz Operation's Xenix 386 operating system on its Tandy 4000 microcomputer.

The 4000 is the third Tandy system to run Xenix, according to Ed Juge, director of product development for Tandy. Juge said multiuser systems represent a significant percentage of Tandy's sales. However, he declined to offer actual figures.

Tandy's announcement at

Comdex/Fall '87 represents a continued commitment to the multiuser systems market, in which Tandy has been a major player through its Radio Shack Computer Centers, Juge said.

Microsoft Corp. MS-DOS-based systems make up the greatest share of Tandy's revenue, Juge added. Versions of Xenix are also available on Tandy's Intel Corp. 80286-based and Motorola, Inc. 68000-based systems.

"The wave of the future is the 386-based system," Juge said. "Xenix 386 is the first operating system that takes advantage of the 386 processor." Tandy's Intel 80386-based 4000 also operates under MS-DOS and is compatible with Microsoft's and IBM's as-yet unreleased OS/2.

Santa Cruz's Xenix 386 Version 2.2.2 is available on 3½-in. disks, to be sold at Tandy's Radio Shack Computer Centers for \$695.

COMDEX/FALL '87

Show wrap-up

Commodore all set to enter DOS arena

BY ALAN J. RYAN
CW STAFF

LAS VEGAS — Commodore Business Machines, Inc. last week said it will enter the DOS marketplace early next year, with at least two of three products scheduled to ship in the first quarter.

At its booth here at Comdex/Fall '87, Commodore displayed its PC10-3, which is currently awaiting Federal Communications Commission approval. However, the three-slot small-footprint unit based on Intel Corp.'s 8088 chip was not formally announced.

"When we have it in the warehouse and are ready to ship it, then we will announce it," said Rich McIntyre, Commodore senior vice-president of sales and marketing.

McIntyre said an IBM Personal Computer AT compatible based on Intel's 80286 chip will follow in the first three months of 1988. He also said an Intel 80386-based unit will make its debut before June 1988.

Commodore currently does not market any Microsoft Corp. MS-DOS products in the U.S. During the third quarter, the company discontinued manufacturing two IBM PC XT-compatible MS-DOS-based units — the PC10-1 and PC10-2 — in preparation for the newer and faster MS-DOS products, according to a Commodore spokesman.

McIntyre claimed his company's imminent broadened product lines, based on both Intel and Motorola, Inc. processor chips, will put Commodore into markets ranging from home and education to small business and corporate America.

"We're the only manufacturer capable of doing so. No one in the business today could bring out a Commodore 64 product and then top out with a 386 product," he said.

Commodore sold one million Commodore 64s last year, according to McIntyre.

Pricing on the new units was not disclosed, but McIntyre said they would feature low-cost "Commodore-type pricing."

Intel board ups PS/2 memory

BY ED SCANNELL
CW STAFF

LAS VEGAS — Intel Corp.'s Personal Computer Enhancement Operation last week unveiled a version of its Above Board that provides users of IBM's Personal System/2 Models 50 and 60 with up to 2M bytes of expanded memory.

Christened Above Board 2, the product is the first Lotus/Intel/Microsoft Expanded Memory Specification 4.0 board that works with IBM and Microsoft Corp.'s OS/2 operating system. It is also 100% compatible with the BIOS system used in the PS/2s.

Intel will reportedly position Above Board 2 as a long-term memory solution for DOS and OS/2 applications and as a way to get optimum performance out of multitasking programs such as Microsoft's Windows and Quarterdeck Office Systems, Inc.'s Desqview.

"Not all PS/2 memory cards are the same," said Jim Johnson, general co-manager of Intel's enhancement operation. "Users want to be absolutely sure that add-ins for the Models 50 and 60 will support OS/2 and the PS/2. Now, they can mix and match Intel and IBM memory cards in the same system." Users can switch between EMS 4.0 and OS/2 memory through a built-in software program, Johnson said.

Above Board 2 is the first Intel memory card to use Single In-Line Memory Modules. With these modules, users can run their systems at 10 MHz with no-wait states, according to Bob Trexler, Above Board product manager.

Software utilities included with Above Board 2 include random-access memory disk support, which allows users to store and quickly access large programs, diagnostic routines that automatically take bad memory chips off-line at power and a print buffer.

Intel said it will ship two versions of the product to its dealers in January. One will have no memory installed and will cost \$445; the other, with 512K bytes of memory, will cost \$645. Dealers will reportedly have the ability to provide Above Board 2 in higher density configurations.

Record attendance barrages show floor



WAYNE C. KODEY

Attracting more and more MIS executives, Comdex is quickly becoming an end-user show; this fall's event saw a storm of 386 products rivaling the deluge Mother Nature sent to the show.

Wordperfect upgrade unifies text, graphics

BY STEPHEN JONES
CW STAFF

LAS VEGAS — Wordperfect Corp. last week announced an upgrade to its industry-leading word processing package that features integrated text and graphics, improved page preview and "intelligent printing" that automatically changes a document's fonts to correspond with different printers.

Wordperfect 5.0 is scheduled to be available in March at a price of \$495. The package was designed for IBM Personal Computers and compatibles and requires a graphics card, such as IBM's Enhanced Graphics Adapter or Hercules Computer Technology, Inc.'s Graphics Card Plus, if the user wants to view a document before it is printed.

The Orem, Utah-based company also announced plans for Wordperfect Office, an office automation product featuring electronic mail and programs that schedule events and coordinate employees' calendars. That package, too, is set for March delivery, but pricing was not disclosed.

Wordperfect 5.0 reportedly supports a variety of graphics

formats, including Lotus Development Corp.'s PIC files, PC Paint Brush and Publishers Paintbrush. Those graphics can be sized, cropped and inserted into a document with text automatically wrapping around the image, a Wordperfect representative said.

Wordperfect claimed it has sold one million copies of earlier PC-based releases of the word processing program.

With a graphics card, users will be able to see a document on-screen in preview mode and zoom in to check text or view facing pages together, the vendor said. However, there will be no editing of text and graphics in the "what-you-see-is-what-you-get" preview mode.

Intelligent printing is aimed at solving the problem of printing a document that has been designed for a specific printer and is incompatible with another. The feature will allow a document created for a printer with large fonts and italics to be automatically printed on a dot matrix printer.

Other enhancements will include an increased number of print attributes and color support for color printers and automatic referencing.

BIOS line, PS/2 tied

LAS VEGAS — Phoenix Technologies Ltd. last week unveiled a line of read-only memory (ROM) BIOS products that reportedly will provide compatibility with the BIOS used by IBM in its Personal System/2 personal computers.

The products, which support the Micro Channel bus architecture, are available for licensing to OEMs building PS/2 compatibles. Lance Hansche, vice-chairman and president of Phoenix, predicted widespread adoption of the ROM BIOS technology during the first quarter of next year.

The Norwood, Mass.-based company also released Compatibility BIOS for the PS/2 series that ensures backward compatibility with real-mode applications and Microsoft Corp.'s MS-DOS 3.3. Another product, Advanced BIOS, offers enhanced low-level support for system designs.

Phoenix also announced that it has agreed to license its Page Printer Control System product line to Canon, Inc. Hansche said Canon will use Phoenix's Postscript-compatible technology as an extension to the proprietary command language used in its line of laser printers.

Pacts expand Netware base

Novell signs deals with Oracle, The Software Link to merge product lines

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — Novell, Inc. announced last week two strategic alliances designed to enable users of its Netware operating system to take advantage of SQL-based relational data base functionality and the power of an Intel Corp. 80386-based operating environment.

At separate press conferences here at Comdex/Fall '87, Provo, Utah-based Novell announced technology exchange agreements with Oracle Corp. in Belmont, Calif., publisher of a namesake relational data base management system, and The Software Link located in Atlanta, which markets PC-MOS, a multiuser, multitasking operating system for 80386-based computers.

Of particular significance is the arrangement with Oracle, according to users and analysts. Novell and Oracle said they will integrate their product lines. Oracle customers will be able to use Netware to connect with a variety of network schemes, including Ethernet, token-ring networks and Arcnet, according to Novell.

Adds another link

More important, the integration project will offer some large companies a comprehensive strategy for linking all of their computers through all of their networks, said Lawrence J. Elli-

son, Oracle's president and chief executive officer.

Ellison was referring to those users who have Oracle products running on personal computers, minicomputers and mainframes and who also utilize Netware-compatible Transmission Control Protocol/Internet Protocol (TCP/IP) products to link their local-area networks (LAN) to minis and mainframes using standard TCP/IP.

Support for Excelan, Inc.'s TCP/IP Workstation for Netware and Novell's TCP/IP Gateway will be available in the first quarter of 1988, Oracle said.

The two companies also claimed the agreement will allow many applications that have been handled by minicomputers or even mainframes to be run on networked PCs.

Toward that end, Oracle is modifying its PC products to support Novell's IPX protocol at the session level.

This enables customers with Netware LANs and Oracle's DBMS to implement transaction processing applications previously relegated to minicomputers, Novell claimed. An IPX interface will be available in the second quarter of 1988, Oracle added.

Also of interest to users is the potential for increased network speed. Portions of data base applications typically reside on both the workstation and the server.

Activity back and forth between the two creates bottlenecks on the network and also takes up valuable memory at the workstation.

But moving Oracle on a Netware server eliminates much of the traffic on the network because of data base requests, speeding the network up by a factor of as much as two to three times while also freeing up some of the memory available on the user side.

Moving into position

"Novell is trying to strongly position themselves into the fact that people don't need [OS/2] Extended Edition," said Jerry Schneider, president of the Washington, D.C.-based Capital PC Users Group.

Instead, Novell will attempt to convince users that by using OS/2 Standard Edition Version 1.0 and by bundling in the best data base product available — which Novell believes is Oracle — users will have what they need, Schneider explained (see story page 138).

The agreement between Novell and The Software Link provides Netware support for PC-MOS/386 via the Netware PC-MOS/386 Support Package, which reportedly will be available in the first quarter of 1988 for \$50.

The package is targeted at users who require advanced multitasking capabilities at the desktop level.

Borland's Paradox primed for OS/2 use

LAS VEGAS — Borland International announced a version of its Paradox relational data base last week that will run under OS/2 and be available in the first quarter of 1988.

Paradox OS/2 breaks the IBM PC-DOS 640K-byte random-access memory barrier, allowing up to 16M bytes of memory to be used, Borland said. Although the product is basically

a port of Paradox to OS/2, Borland is betting it can attract a number of users who desire the multitasking capabilities of the new operating system.

Philippe Kahn, Borland's president, said the OS/2 version of Paradox also operates from 20% to 30% faster than the current Microsoft Corp. MS-DOS-based release.

Borland would not discuss the

product's price, but officials said the cost of all upcoming OS/2 packages will be kept in line with the company's reputation for low-priced software. The PC-DOS version of Paradox is priced at \$695. Paradox OS/2 can reportedly work simultaneously with Quattro, Borland's spreadsheet, and share files when Quattro is running in the "compatibility box" with OS/2.

INSIDE LINES

Ginsburg won't be needed on this one. AST Research and IBM settled their differences last week over AST's use of the phrase PS/2 in its advertising, avoiding what promised to be the most ludicrous abuse of the civil court system in recent memory. AST agreed to discontinue an ad with the headline, "PS/2 Memory. Our Name Says it All." But IBM agreed to allow AST to use "/2" in the names of two PS/2 add-on boards, Rampage/2 and Advantage/2. AST pledged to "respect" the Personal System/2 and PS/2 trademarks in the future.

Take a right onto the superhighway. Setting up shop quickly to compete with his former employer, Cray Research, highly touted supercomputer designer Steve Chen announced last week the formation of Supercomputer Systems, Inc. Chen will not be far away, however; his company, which intends to develop a parallel processing supercomputer, is located in Eau Claire, Wis. — just down the road from Seymour Cray in Chippewa Falls.

Into the spider's lair. Intel is finally getting into the IBM PC AT-compatible chip set market that has been so lucrative to start-ups like Chips and Technologies. At Comdex/Fall '87, Intel announced a multifunction peripheral chip set built around its 80286 microprocessor for OEM designs at 12 MHz. It is interesting to note, however, that Intel is second-sourcing the chip set from a small Silicon Valley semiconductor firm, Zymos. Intel has made news — and lawsuits — this year through its efforts to eliminate all agreements in which other chip companies second-sourced Intel's 286 and 386 chips. "Zymos gets no rights to Intel chips with this agreement," an Intel spokesman said. "This just gives them insight into future trends and gives us a speedy time to market with their chips."

Too late for our special report. Borland International President Philippe Kahn was reportedly riding high when he discovered the agenda for IBM's OS/2 press conference at Comdex. While Kahn's speech at the press and dealer breakfast came after market share leaders Lotus and Microsoft, the Borland founder got to speak prior to Ed Esber, chairman of No. 3-positioned Ashton-Tate.

Closing the barn door. Computer leasing leader Comdisco said last week it will depart the risk arbitrage business. The Comdisco board made the decision after Comdisco's arbitrage investment unit sustained a paper loss of \$100 million in the stock market crash. Although actual losses will be less, the unit's performance may still drag Comdisco's overall business into the red in the first fiscal quarter for the second straight year. The same unit lost \$22 million a year ago when Ivan Boesky's guilty plea sent takeover stocks plunging. In a separate part of last week's announcement, it was appropriate that Comdisco elected a new board member with the name of Rick Kash.

Half of nothing is a big deal? According to several sources, Relational Technology has copped a contract with IBM under which IBM will offer Relational Technology's Ingres data base for sale with the (Stop Yawning!) IBM RT PC. However, this does not necessarily mean IBM will dump its current offering from Relational Technology rival Oracle. According to IBM, the firm will support the most popular Unix offerings on the RT, even if that means supporting products that compete against each other. IBM adds that it will not dump support for Oracle.

Exploratory surgery. IBM confirmed last week it is exploring whether to offer a maintenance referral service for its large accounts that have multivendor shops. Under the single-point-of-contact plan, a customer would call IBM with all service needs. IBM would, in turn, call non-IBM maintenance providers as necessary to have them fix the equipment they handle. IBM, according to a company spokesman, is trying out the arrangement with "one or two" accounts to see how the program works but added that the plan is not yet a formal offering. The spokesman said the plan is an expansion of a similar service IBM offered to customers using IBM PCs to which non-IBM equipment was typically attached.

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Computerworld (ISSN 0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), June (6 issues), July (5 issues), August (6 issues), September (6 issues), October (5 issues), November (7 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

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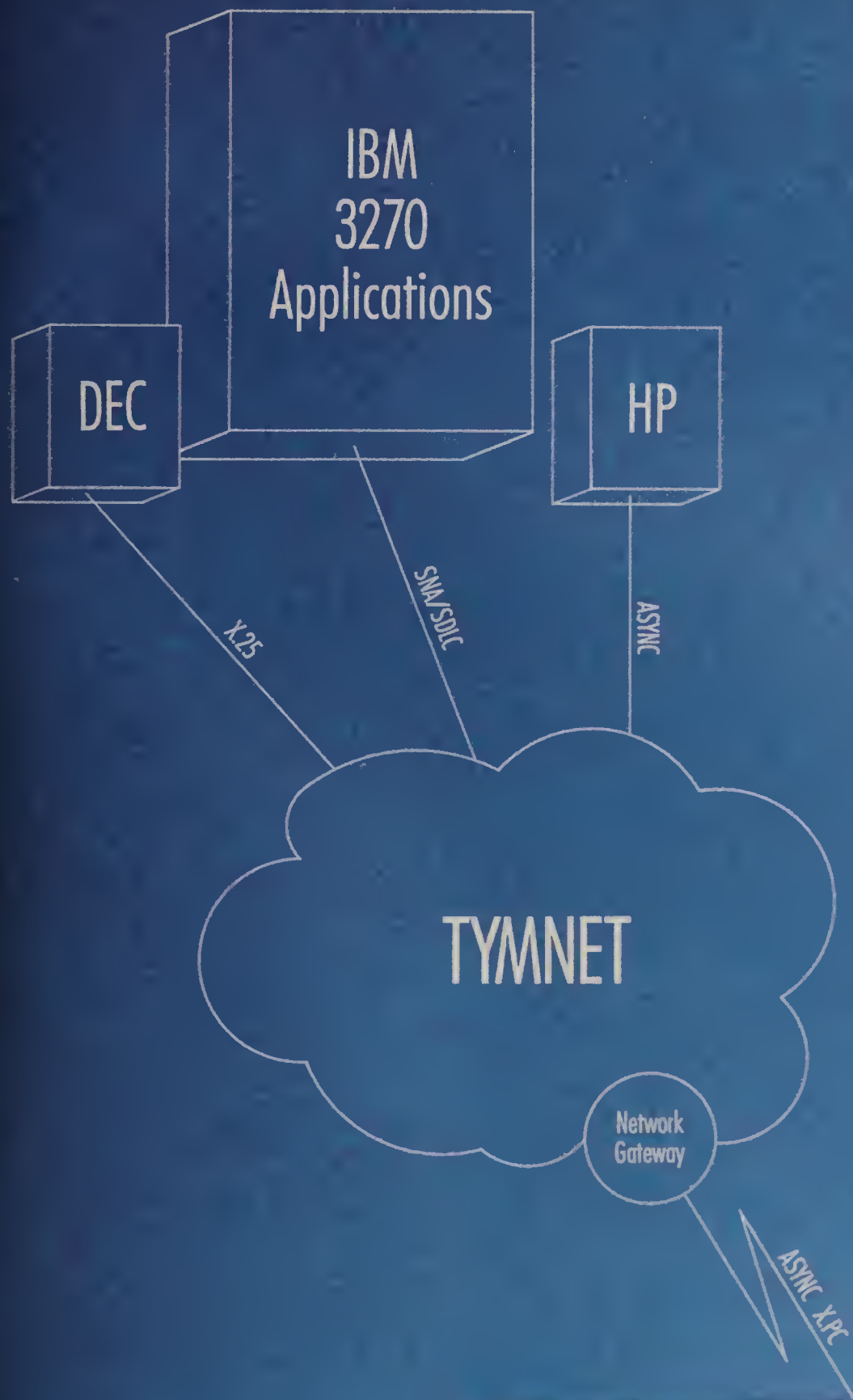
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